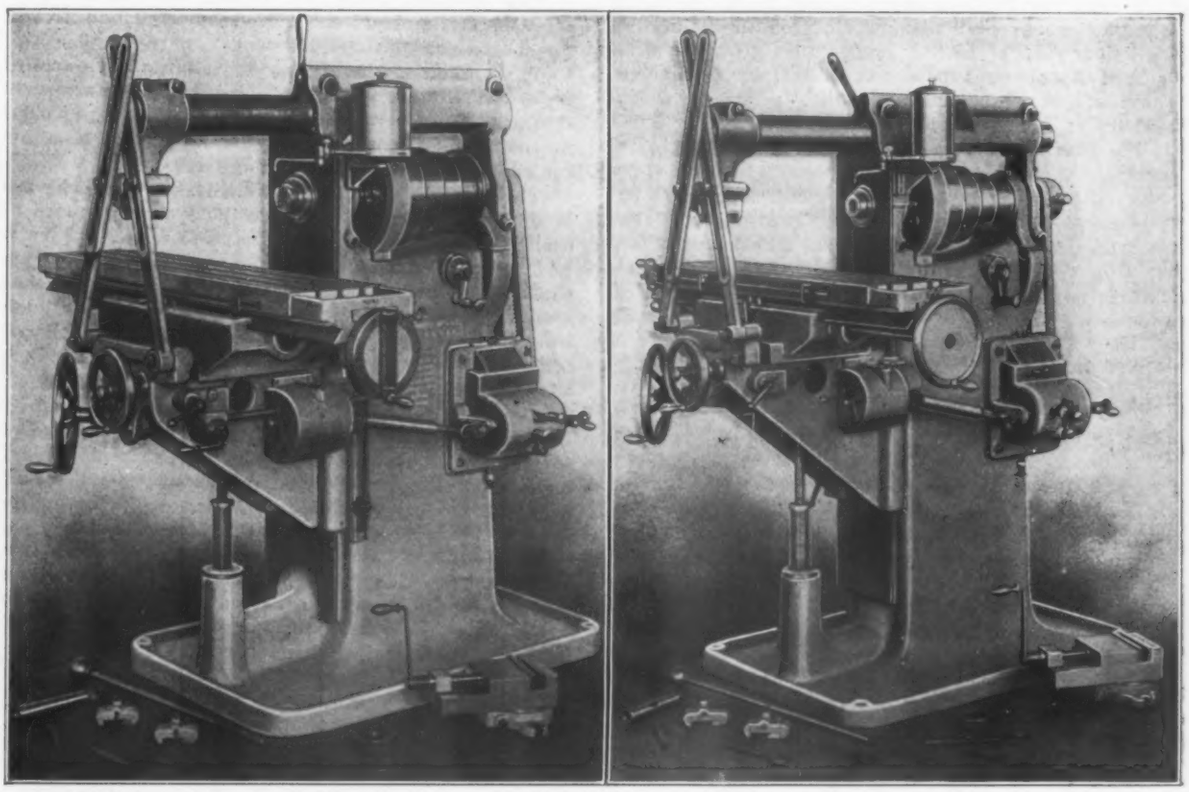
THE IRON AGE

New York, Thursday, August 30, 1906.

New Brown & Sharpe Milling Machines.

Two new plain milling machines known as the No. 1½ and No. 2 heavy have been added to the line built by the Brown & Sharpe Mfg. Company, Providence, R. I. The machines are entirely new in general design and embrace several important changes from the company's previous machines of similar type. The feed mechanism, including the quick change arrangement, is the same as that of the vertical milling machine described in *The Iron Age* February 23, 1905, with slight improvements to it which were covered in the description of the company's automatic gear cutting machine in the June 29, 1905 issue. Other new features are the upward extension of the knee bearing on the column, providing a rigid support to the spindle, and a means of clamping attachments to make them practically a part of the machine itself; a clutch which engages and disengages the entire feed mechanism while the spindle is working; clutches for engaging and disengaging the hand wheels, and the inclosing of the back gears within the column. Both machines are provided with automatic longitudinal and transverse feeds, and the No. 2 heavy machine has in addition an automatic vertical feed. In other respects the two machines are practically identical in general design and mechanism.



The New No. 2 Heavy and No. 1½ Plain Milling Machines Built by the Brown & Sharpe Mfg. Company, Providence, R. I.

Each machine is driven from a four-step cone pulley and is back geared, the gears being inclosed within the column, which adds to compactness and rigidity, and thrown in and out by a crank lever on the side of the column just under the cone pulley. With a three-speed countershaft 16 changes of speed, direct and reverse, are obtained. The positive feed is driven by chain from the spindle to the gear case. There are 20 changes of feed, varying in practically geometrical progression. The positive clutch at the end of the spindle, by which the chain drive and consequently the feed works are disconnected while the spindle is running, permits the operator to use hand feed for delicate work, employing the hand wheels.

The extension of the knee slide to the top of the frame furnishes a stiff support for the front spindle bearing. The crucible steel spindle, running in heavy boxes of special bronze, adjustable for wear, has a hole its entire length, and the front end is threaded to receive a chuck or large cutter and has a standard taper hole. A guard nut is provided for protecting the thread when not in use. The front spindle box projects beyond the face of the column and forms a support to hold the weight of the attachments and relieve the spindle from the strain due to sustaining this weight. It also affords a boss for use in the quick centering of attachments. The extended knee slide makes it possible to clamp any of the regular attachments directly to the face of the column in such a manner that they become practically a part of the machine casting. The overhanging arm is a solid steel bar that can be pushed back when not in use. It is simply and efficiently clamped at both bearings with one lever at the front of the machine, enabling the operator to make adjustments quickly.

Hand wheels are provided for the cross and vertical feed shafts for use when feeding by hand, the operator being thus enabled to follow the rim of the wheel with his hand and easily see the work. As the vertical feed shaft is placed at an angle the operator has control of the various movements of the machine without changing his position or removing any handles, and any two feeds can be operated simultaneously without interfering one with the other. Each hand wheel is provided with a clutch that is engaged by a knob at the center of the wheel, which permits it to remain stationary after ad-

justment is made and prevents the accidental disturbance of the setting. The levers for controlling the various feeds are located at the right of the knee for convenience in manipulating. One lever on the side of the reverse gear case serves to start, stop or reverse all feeds; the other two levers control respectively the automatic transverse and vertical feeds when machines are so fitted. The table feed screw is not splined, an auxiliary shaft being provided for driving the clutch gears, and as the threads are unbroken the life of the screw and nut is prolonged and the original accuracy maintained. The adjustable dials, tripping mechanism and other mechanical features of the machine are of the standard Brown & Sharpe types.

The No. 1½ machine, shown at the right in the engraving, has 16 speeds running from 16 to 318 rev. per min., with eight reverse speeds from 17 to 290 rev. It has a longitudinal feed of 24 in. and a transverse feed of 7 in., both automatic, and a vertical hand feed of 19 in. The 20 changes of feed vary from 0.003 to 0.15 in. per rev. of the spindle. The table has a working surface of 10¼ x 35 in. This machine is adapted not only to tool room use but also to general jobbing purposes, and is a particularly profitable machine for all varieties of the lighter class of milling except the cutting of spirals or work that requires the setting of the table to an angle. The floor space required is 56 x 80 in. and the net weight 2600 lb.

The No. 2 heavy machine, shown at the left in the engraving, has 16 speeds running from 13 to 439 rev. per min. and eight changes of reverse speeds from 22 to 305 rev. The feeds, all automatic, are: Longitudinal, 28 in.; transverse, 8 in.; vertical, 19 in. The 20 changes of feed run from 0.004 to 0.2 in. to 1 rev. of the spindle. This machine is furnished with hand transverse and vertical feeds when desired. The working surface of the table is 12⅝ x 43 in. The machine occupies a floor space of 61 x 93 in. and weighs 3600 lb.

Mexican Railroad and Industrial Notes.

Railroad Concessions and Construction.

DURANGO, AUGUST 22, 1906.—The contract for the construction of the Mexican Central's extension from Marfil to Guadalajara has been awarded to J. J. Moylan of the City of Mexico. The Paredow-Saltillo branch of the same company is about completed, and will be ready for regular service in the course of a few weeks.

A modification has been made of the concession for the railroad projected between Guadalajara and the Pacific port of Chamela, extending the time for the construction. According to the amendment 150 km. of the line must be finished by January 31, 1908, and 100 km. in each year following, the entire line to be completed within five years from July 21, 1905.

It is reported in the local press of the State of Oaxaca that the owners of the Oaxaca & Oriente Railroad will extend the road to Tlacolula and the ruins of Mitla. It is also said that the line will ultimately be extended to the isthmus of Tehuantepec.

Preliminary work will soon be commenced upon the line of the Interoceanic, a part of the merger system, with the object of changing the track to standard gauge. The road runs from the City of Mexico to Vera Cruz, and with its branches comprises about 700 miles of trackage.

Industrial Notes.

It is reported that the Southern Pacific Railway Company has placed another order in Spain for steel rails for its Mexican extension, the quantity being 50,000 tons.

The Mexican Central Railway Company has placed a large additional order for locomotives with the American Locomotive Company. The present year has been a phenomenal one in the amount of passenger and freight business upon all the railroads, and in the placement of orders for new equipment to meet the emergency.

In the month of June Mexico exported to the United States 3,265,920 lb. of copper, and in May 3,698,240 lb.

A reorganization of the Torreon Iron Works, Torreon, Coahuila, occurred recently. Officers were elected as follows: E. H. Barton, president; Emilio P. Stein, treasurer, and J. Newman, secretary. The company conducts a general foundry business.

A Mexican daily in the capital thus bears testimony to the increased demand for improved agricultural implements and machinery: "It is reported that dealers in farming machinery and implements of all kinds are in receipt all the time of large orders from the plantations and haciendas of northern Mexico. This is a most excellent indication of the employment of modern farming methods, which in nearly every instance increases the productive ability of a piece of ground from 25 to 50 per cent. The American hay and manure forks are coming into more general use, and reports are that farmers are beginning to stack their hay after the American custom."

The L. M. Rumsey Mfg. Company of St. Louis, Mo., manufacturer of plumbers' supplies, has made arrangements to open a branch house in the city of Mexico to supersede the agency which they have maintained there for some time past. A company, bearing the same name as the parent concern, and capitalized at $50,000, of which L. M. Rumsey is the president, is to be formed to conduct the Mexican branch.

The National Railway Company has ordered from the United States recently 22 heavy Baldwin freight locomotives and 300 freight cars.

P. J. Nolan and Francisco S. Gallardo have applied for a concession to establish a nut and bolt factory in the Republic. They pledge themselves to invest $100,000 in the business, and ask for the usual franchises accorded to new industrial enterprises.

The Mexican Central is gradually extending the use of oil burning locomotives over the system in place of coal burners.

The strike of the machinists at various places upon the Mexican Central and in that company's employ has come to an end. Representatives of the workmen's union waited upon President Diaz and related their alleged grievances. The President gave them some wholesome advice, which resulted in their returning to work.

Concessions for water rights have been obtained by the Compañia Industrial del Paso del Rio, which purposes constructing hydraulic works on the Armenia River, district of Tecoman, Colima, and using 3000 liters of water per second for irrigation; Narcross & Taylor, to use 3500 liters per second from the Nogales Lagoon, Canton of Orizaba, State of Vera Cruz, for the generation of motive power. Applications for concessions have been made by the following: A. B. Adams, who desires to use 500,000 liters per second from the Balsas River, State of Guerrero, either for hydraulic power or to generate electric power for use in mines in the Bravos district; Ortiz & Arocena ask for permission to use 2500 liters per second from the Tecolapa River, municipality of Saltabarranca, State of Vera Cruz, for irrigation; Juan de Velasco and Carlos Bello, to use 2000 liters per second from the Baltasar River, district of Atlisco, Pueblo, for motive power; Francisco Lauvier asks for right to utilize 8000 liters per second from the river Frio, district of Valles, San Luis Potosi, also for motive power, and Samson Lang, for a like purpose, wishes to use 2000 liters per second from the river Tamasopo, district of Rayon, in the same State.

J. J. D.

The latest publication of the British Engineering Standards Committee is "Standard Specifications for Structural Steel for Bridges and General Building Construction." While one of the most important, the report is one of the shortest the committee has made. The phosphorus and sulphur limitations are given, with details of required mechanical tests and a series of views of the different forms of tensile test pieces.

In the construction of the foundation for the new United States Realty Building on Broadway, between Cedar and Pine streets, New York, what is said to be the world's record for speed in caisson foundation work was finished by the Foundation Company, New York, last week when 87 caissons, 75 ft. deep, were put down in 60 days. The work cost about $500,000.

Internal Strains in Iron and Steel.*

BY HENRY D. HIBBARD, PLAINFIELD, N. J.

A noted ordnance engineer once said to a friend, in speaking of the production of great steel guns, "How is it? We design our guns with a factor of safety of eight, and the guns burst." The vague way in which internal stresses and strains in iron and steel are often considered and spoken of makes it worth while to examine their causes and results, how they may be advantageously dealt with, and how when detrimental they may be reduced or kept within harmless proportions. Rankine defines "strain" as a change of form or dimensions of a solid or liquid mass produced by a stress. This definition seems not intended to cover strains due to internal stresses, and it will help us in the present inquiry to consider strain as a tendency to change as well as an actual change of form.

Internal strains in iron and steel are the result of stresses within the mass of the piece, some parts being in tension and some in compression, each part striving to relieve itself from strain and make the piece assume a form in which all parts are at rest. The internal strains we are now to consider are not those due to the stresses of the service which the piece is rendering, but those which originate or at least are contained in the piece itself.

Internal strains reduce the specific gravity of a piece of iron or steel. Consequently, the metal is heaviest when it is in the annealed state. It is common to assume that a piece of steel which has been cold hammered or cold rolled or wire drawn is "more dense" after these operations than it was before, when it is actually lighter. Internal strains accompany if they do not indeed cause inferior resistance of the metal to chemical action. A file broken off, and the broken end immersed in dilute hydrochloric acid, has been found to have lost a greater thickness of metal from the hardest part, at and near the outside, in which the strains are greatest, than from the less hard central portion. The quick corrosion of wire nails and wire fence may possibly be ascribed to the cold worked condition, and directly or indirectly to the internal strains. The corroding agent more readily enters the mass of the metal, it may be, because of larger intermolecular spaces.

Two General Classes of Strains.

For the purpose of this paper, internal strains in iron and steel may be divided into two classes, according to the causes which produce them: 1, Those caused by an irregular rate of change in temperature—that is, of heating or cooling. 2, Those caused by cold working or permanent change of shape of the piece under consideration by mechanical means at atmospheric temperatures, or at least at temperatures below that at which the metal is softened.

Internal strains due to irregular heating or cooling are by far the more important of the two classes. Because iron expands when heated and contracts when cooled, and indirectly for other reasons, internal strains, varying in all degrees from harmless to fatal, exist in all pieces of iron and steel. This arises from the fact that all commercial iron and steel is the product of processes involving heat, the strains in most cases being those set up by the more or less irregular rate of cooling. The amount of change in temperature does not affect the strains produced. The rate determines all.

The strains due to irregular cooling, unless chemical changes are involved, are apparently between part and part. Those due to cold working may be considered as between molecule and molecule because of the disarrangement of the molecular formation. The latter results usually in strains between the parts as well. Strains which come under this division of the subject should be considered under two aspects: 1. Those which arise during the continuance of the causes which produce them—that is, temporary strains. 2. Those which remain after their causes have ceased to act—that is, permanent strains. Temporary strains in many cases become permanent, especially when set up during cooling at an irregular rate. The phenomena of permanent strains are, during their formation, the same as of temporary strains.

The following cases will illustrate the two ways in which each kind of strain may result in rupture of the piece. When an ingot of hard steel is placed in a red hot furnace, and is so ruptured internally by the faster expansion of the exterior, due to the rapid heating it undergoes, that it separates into pieces when forged or rolled, its ruin was caused by strains occurring while the cause, namely, the quick heating, was in operation. This is a typical example of temporary strains in steel. When a boiler plate of soft steel, lying cold on the floor of the shop, cracks suddenly it is because of strains existing after their cause had ceased its action. This is the usual kind of internal strains occurring in iron and steel, and is the kind chiefly meant in what follows in this part; it is an example of permanent strain. These two instances cited are, it will be understood, extreme cases, in which the piece is ruptured by the intensity of the strains. Strictly speaking, permanent strains are but relatively permanent, since they decrease when the piece is again heated, or through the seasoning or annealing action of time. When strains result in rupture of the piece of metal they are thereby much reduced in amount and otherwise modified.

While strains are unavoidable, they are—except in special cases—undesirable in proportion as they are great. The exceptions arise when the strains increase desirable properties, as, for instance, hardness in hardened steel.

Expansion and contraction of iron and steel by change of temperature, where the new temperature has become uniform throughout the piece or structure, does not set up new permanent strains or materially change those existing between the different parts of the piece or structure, provided the different parts are all of the same kind of metal, or at least of metals having the same coëfficients of expansion. In a structure made of metals having different coëfficients of expansion rigidly fastened together, a change in temperature is sure to increase or decrease the strains.

The intensity of the strains considered in this part depends on the following determining factors: 1, the rate of change of temperature; 2, the shape of the piece; 3, the bulk or volume of the piece; 4, the elastic limit of the metal; 5, the ductility of the metal; 6, the coefficient of expansion of the metal.

The Rate of Change in Temperature.

1. The rate of change of temperature is the great governing condition producing or reducing internal strains both temporary and permanent. The faster the rate, the greater the strains. The amount of change, however great, is unimportant in this connection if the rate be sufficiently slow. The rate depends on the difference between the temperature of the piece of metal and that of its environment, and on the heat conductivity of the metal. The greater the difference in the temperatures mentioned, the greater the strains resulting, and the greater the heat conductivity the less the strains. A poor heat conductor like manganese steel must, if massive, be heated very slowly if dangerous strains are to be avoided.

Extreme cases in which the rates of change of temperature are the greatest met with in the practical manipulation of iron and steel are: for rising temperature, when the article is placed cold within the hot heating chamber of a furnace, and for lowering temperature, when it is taken heated from a furnace and plunged into a cooling bath. During a change of temperature strains are set up within the piece, through the differences in expansion and contraction, due to differences of temperature of the parts. These differences are the greater for a given iron or steel article the more rapid the rate of change.

To avoid danger to the piece from this cause, which is the one to which may be directly laid nearly all the actual damage done by strains in iron and steel, one must maintain less difference between the temperature of the article and that of its environment. If the dangerous

* From a paper read before the American Institute of Mining Engineers, London meeting, July, 1906.

strains arise in heating the article it must be heated more slowly. The heating chamber or receptacle must not be too much hotter than the article placed therein. In extreme cases, the chamber and the article must be slowly heated together, this procedure being called for, however, only in the heating of bulky articles of very hard iron or steel.

Where Slow Cooling Is Essential.

When dangerous strains are liable to arise from too rapid cooling, they may sometimes, as in the case of a cast iron car wheel, be relieved or reduced in intensity by a slower rate of cooling, the red hot wheels being piled up in tight soaking pits built in the ground, and allowed to cool very slowly. The lowering of the temperature of both the thick and thin parts is maintained at a rate sufficiently uniform to ensure their reaching ordinary atmospheric temperatures at about the same time; the thicker parts do not then continue their contraction after the thinner have ceased theirs, which action, if it took place, would result in strains that might easily be dangerous to the integrity of the wheel, in view of the almost total lack of ductility in the cast iron of which it is made.

Many steel castings may not be allowed to cool in the open, or even in the sand, without danger of spontaneous rupture from internal strains, but must be placed while still hot in a heated receptacle, usually a furnace, and allowed to cool with the furnace at a much slower rate than if in the open air. Steel wheels, as well as the iron car wheels mentioned above, usually require such treatment, though the ductility of the softer grades may admit of its omission. On the other hand, the greater coefficient of expansion of steel tends to set up greater strains than those of the iron wheels.

In special cases, for example, in cutting tools of steel where only the cutting edges demand the rapid change of temperature, some relief, often adequate, is to be afforded by heating only the cutting edges themselves to the hardening heat. Then the remainder of the article will not have to undergo such a rapid change of temperature as if made as hot as the hottest part, and the resulting strains in the tool will be much lessened and perhaps made harmless.

If a piece of cold iron or steel of uniform temperature, in which the strains are the result of cooling, be cooled further, uniformly as to the exterior surface, the strains will be temporarily reduced and may be wholly eliminated during the cooling operation, only to be restored much as before when the temperature of the piece has again become uniform. Such a piece of steel presents during the further cooling the only exception to the statement that all pieces of cold iron and steel have internal strains. A further practical exception is found in the case of a piece of cold iron or steel which has been cooled from a red heat, at which it is too soft to have strains, at an exceedingly slow rate, as in the case of the car wheel mentioned. When the slow rate of cooling is actually continued to atmospheric temperature the article is practically free from strain.

Spontaneous cracks in cold soft steel are still not wholly explained. When such cracks occur in hard and hardened steels or in cast irons which have practically no ductility they are easier to understand, though even in such cases just what was the "last straw" which caused the rupture is not usually apparent. This is on the assumption that the composition of the steel is suitable, particularly as regards phosphorous and oxygen, which must not be present in too great proportions, and further that the steel was well cast and rolled or forged.

Whether or not in the case of the soft steel boiler plate it was an additional strain due to a slight change in temperature, or vibration from some outside cause, or that the fatigue of the metal under strain progressed more rapidly than the relief of strain due to time, and the operation of what might be called annealing by natural causes, is not clear. It is probably directly due to the last of these possible causes following a lessening of the ductility of the metal through working of the piece at the well-known critical temperature termed the "blue heat." Spontaneous rupture never occurs in an old article of iron or steel, provided, of course, that no new strains have been set up within it.

The Shape of the Piece.

2. The shape of the piece of metal affects strains very greatly when it is heated or cooled. If it be made up of relatively thick and thin parts continuously connected to each other, such as the thin web and thick hub and rim of a car wheel, on changing its temperature strains will be set up within it not only between the interior and surface portions but between the thick and thin parts as a whole. In the case of a cast car wheel these latter strains are those which are dangerous, causing the breakage and consequent destruction of the usefulness of the wheel if they be allowed to develop to their fullest extent by allowing the wheel to follow its own rate of cooling in the open.

Large plane surfaces tend to intensify strains due to change of temperature of a piece of iron or steel either from heating, cooling from a high or casting temperature, or quenching. The plane surface, cooling or heating more quickly at its edges than elsewhere, cannot yield to internal tension or compression stresses by change of shape, as such stresses act in straight lines within the piece. Relief may sometimes be afforded by curving or corrugating the surface, as in a casting. But a flat sheet like a saw blade may not admit of this, and then means must be employed to conduct the operation of hardening the teeth, when the strains are set up, so that they will not crack the saw. In the case of a large circular saw blade, partial heating is used, and is effected by protecting the central portion of the sheet with thicker iron plates during the heating and cooling operations. The protected portion is not hardened, and has therefore a lower elastic limit and higher ductility than the hardened rim, and will thus yield a little without breaking.

The Bulk or Volume of the Piece.

3. The bulk of the piece of metal has great influence on its strains when its temperature is changed because of the distance which heat must be conducted between the surface and interior parts. When the bulk and therefore this distance is relatively great the strains are great in proportion, and when the bulk is small they are less. High conductivity of heat tends to offset great bulk in the strains resulting from a change in temperature.

With a piece of metal of a given contour the strains from either cause may be much reduced by reducing the bulk by means of recesses or slots or other holes properly made in the piece. The quenching operation in particular then causes much less strain. In the case of a large tap this principle is applied by drilling a hole along its axis, which has a double effect. First, it allows the cooling fluid to cool the interior nearly as quickly as the exterior as a whole, and secondly, it reduces the actual thickness of the metal to a fraction, perhaps a third, of what it would be otherwise, and in that way reduces the strains due to bulk.

Solid steel armor plates are sometimes cracked internally by the cooling strains arising from the quenching operation, though the steel is rather soft, with carbon from 0.20 to 0.25 per cent., except the hard face. This may be due to either or both of two causes: 1, When the mass of the armor plate or other piece of iron or steel is so great that the final contraction of the interior portion when cooled may not be compensated for by a reduction of cross-section of the metal (such as occurs when a test piece of ductile metal is pulled apart in the testing machine), then internal cracks may occur from the metal being overstrained, regardless of the ductility of the metal. 2, The ductility of the soft steel of the body of the plate is impaired by the long continued heating without work during the carbonization by the cementation process of the face, which is to be hard, and for that reason will not endure internal strains as well as its composition would indicate. Holes or recesses not being admissible, though they have been recommended by some, reforging or annealing to break up the coarse crystalline structure existing in the plate is resorted to, after cementation, in an effort to avoid this defect. Nevertheless, the results are not always as desired.

Layers of Soft and High Carbon Steel.

It does seem, however, that careful experiment should develop a method for making a large soft steel ingot, with a high carbon steel layer on one side, which could be

forged into an armor plate, thus avoiding the expensive and harmful cementation process. When an article of iron or steel is liable to crack in service from strains, the danger is sometimes best avoided by making it in two or more pieces. This practically amounts to putting cracks in the thing, but often they may be located so as to cause no trouble. The following example will illustrate: A cast iron bottom plate, on the center of which was cast a large ingot of steel, was broken the first time used, by the expansion of the central part heated by the molten steel. On making a plate for the purpose of four pieces bolted together no further trouble from this cause resulted.

4. The elastic limit of the metal affects the intensity of the strains, because when it is low it may allow the metal to yield under the stresses which cause strains so as to relieve them in part.

5. Ductility of iron or steel sometimes allows it to yield without fracture under stresses of sufficient magnitude, so that the strains are in some degree lessened. A highly ductile metal rarely or never breaks from internal strains unless extremely massive. A metal supposed to have great ductility may actually have very little, due perhaps to ill treatment. The boiler plate mentioned had probably been damaged by working at the black or blue heat, so that its ductility was impaired, and the strains arising from irregular heating and cooling were more than the remaining ductility could allow for, and rupture ensued. The armor plates cited also had their ductility much reduced by the long heating during cementation. When, as in cast iron and hardened high carbon steel, there is no ductility, and the elastic limit coincides with the ultimate strength, the strains set up in cooling cannot be relieved, and may easily reach an intensity which will cause the piece to crack or break.

Heating to Relieve Strain Must Be Slow.

6. The coefficient of expansion, strictly speaking, wholly determines the intensity of the strains arising from irregular rates of change of temperature in metals, for if it became zero such strains would not occur. The greater the rate of expansion the more intense become the strains arising from a given rate of change in temperature.

Heating a piece of iron or steel to any degree below the temperature at which it softens will increase the strains within it in proportion to the rate of heating. Therefore, heating to relieve dangerous strain, which is often resorted to, must be very slowly done, so that the interior is heated nearly as fast as the exterior, or the extra strain due to the more rapid expansion of the exterior parts may cause the rupture it is the purpose of the heating to avoid. By such slow heating something like the seasoning effect of time and slightly higher than atmospheric temperature is given to the piece. This effect may be used on large massive heat treated articles of high carbon steel, such as heavy cutters and projectiles and heavy articles of toughened manganese steel, all of which are in a high state of strain, due to immersion at high temperature in a cooling bath.

The increase of strain due to even slow and moderate heating, as, for instance, to the temperature of boiling water, may be used for testing hard heat treated objects, such as armor piercing projectiles, to determine whether or not they are in a dangerous condition, or rather to separate those in danger of spontaneous rupture from those which are not. Without some means for discriminating between them, some of them may lose their points by spontaneous rupture months after they are made and have traveled far.

When a cold massive piece of steel, as an ingot, is to be heated in a furnace, it is a matter of importance to know whether its previous cooling was rapid or slow. If rapid, it may contain so much strain as to be ruptured internally by the heating operation, while if it has been slowly cooled it may, because of smaller internal strains, endure that operation safely. To reduce strains in ingots which are to be cooled to the atmospheric temperature, the rate of cooling should be retarded.

Internal Strains Caused by Cold Working.

The strains due to cold working iron or steel are the result of molecular displacement and very likely of mere changes in the intermolecular spaces, but the theory of the matter we may for the present leave out of consideration. The phenomena occurring with these strains include higher tensile strength, higher elastic limit, greater hardness, less ductility and lower specific gravity. Strains are an unavoidable acompaniment of cold working iron and steel. Those due to cold rolling or wire drawing purposely applied have often useful effects when properly taken advantage of, while harmful or undesirable effects may be avoided by reducing them by annealing or other proper heat treatment. When the pieces of metal so cold worked are not large and the ductility considerable there is no danger of spontaneous rupture. The cold working may, indeed, be continued so as to cause dangerous strains if they be not relieved by heating. The service of larger pieces may be such that they are subjected to cold working, as in the case of a die ring for a centrifugal ore grinding machine, which will cause flow of the metal with resulting strains, and may distort the piece or even tear it apart or break it.

Something like spontaneous rupture is met with in cold rolled or cold drawn shafting when the cold working of the surface portions has so extended them that the interior is strained beyond its strength and thereby ruptured at intervals across the shaft. In that case, when the outer portions are turned off the bar may drop apart.

Useful Cold Working Strains.

The beneficial effects of strains due to cold working come from the higher tensile strength and elastic limit of the metal. Drawn or cold rolled shafting is much stronger per unit of cross section than before the cold working, and wire may be made whose ultimate strength is increased several times by the strains set up in the drawing operation. Wire drawing strains give to some varieties of spring wire the greater part of their springiness.

The increased strength of iron and steel wire due to the strains of cold working is made useful in many ways. In the wire cables of suspension bridges it is relied upon and figured in as part of the tensile strength of the wire. In wire for piano strings and for deep sea sounding tensile strengths of over 400,000 lb. per square inch have been attained, the greater part of which is due to the internal strains set up in the wire drawing process.

The effect of seasoning or annealing by time on cold worked iron or steel such as wire is probably not known, but is very likely an appreciable amount, which, as in bridge wire, may reach important proportions with the lapse of decades.

Strains in cold worked iron or steel may be detrimental in a way. A piece of straight cold drawn shafting if machined, as, for instance in key seating or in turning, is very liable to be not straight after the machining, as cutting away a part of the strained metal removes part of the stresses, and those remaining cause the resultant effect to be different from what it was, and the new adjustment necessary is found in a new shape of the piece.

The modifications and removal of strains due to cold working by heating for long or short periods of time, one or more times, to temperatures below redness requires investigation. By these temperatures is meant those all the way down to atmospheric, and especially those from 212 to 408 degrees F., the latter being the temperature at which a faint straw color is given to steel of a certain composition. Removal of dangerous strains by subjection to heat not great enough to discolor the surface of the metal would be a good thing in many ways, if feasible. A cold worked piece of shafting, which will break off in the lathe when the outer skin is removed, might perhaps be practically cured by such heating between the rolling or drawing operations.

In the specifications for wire for a great suspension bridge, the wire as drawn must have a tensile strength of 215,000 lb. per square inch, and after galvanizing must have a tensile strength of 200,000 lb. per square inch. This decrease of 15,000 lb. per square inch is the loss of strength due to removal of strains by heating the wire for a brief period to the galvanizing temperature, or, say, to 800 degrees F. If the heating even at that temperature were long continued, a much larger loss of tensile strength would no doubt result.

The Seasoning Effect of Time.

Many believe that there is a reduction of strain in iron and steel by the seasoning effect of time. Old cast iron cannon, which had given the normal amount of service, were said to have had their strength restored by years of rest. The strains in such cannon were, it is true, the result of service stresses, but such strains in this case are analogous to those produced by cold working, and especially as far as they are affected by annealing by time. In the case of an article of hardened steel, seasoning or annealing by time is held to relieve strains, with the result that the piece is freed from danger of spontaneous fracture or change of shape after being finished, while if unhardened its strength and ductility are increased by such seasoning. In cold worked steel the strength will probably decrease in time, as will the elastic limit, while the ductility will increase.

It is probable that such effect as is produced by time upon a piece of iron or steel is chiefly the result of alternate heating and cooling within the limits of the daily range of temperature, but there is evidence indicating at least that seasoning is effected by time alone, whether or not the temperature of the piece is subject to change.

Consideration of the question of seasoning by time brings up the very interesting one previously alluded to, concerning which we are as much or more in the dark, which is that of annealing iron and steel at low temperatures, that is, in the first phase, at not higher than 212 degrees F.; in the second phase between 212 degrees and the lowest temperature at which steel will be given the faintest straw color, about 408 degrees; and in the third at temperatures between this and red heat. The temperatures giving steel the tempering colors, straw, yellow, blue, &c., vary for different grades of steel, and therefore cannot be stated exactly for steels as a whole. There is much to be learned in these fields, and the second of the three mentioned seems especially to hold out hope of practical benefit to mankind from applications of its laws. We need to know the effect on each kind of steel object in every condition of size, shape, composition and treatment, of time, temperature and fluctuations of temperature within the limits named.

Chemical Changes and Strains.

Annealing by time may be expected to act in a different way on cold worked steel in which the strains may be the result of disturbed molecular arrangements, from that on hardened steel, in which the strains result in great part if indirectly from the chemical constitution of the steel. Perhaps it can be determined just how much of the hardness of hardened steel is due to chemical change and how much to strain. If there is no chemical change in heating hardened high carbon steel to temperatures not higher than the blue color, or even higher, say, to 800 degrees F., then it would appear that any hardening or increase of tensile strength or decrease of ductility which is removed by heating, short or continued, to temperatures not above the blue or the higher degree mentioned, is due to the strains in the piece. The properties due to chemical constitution will then be permanent in the absence of high heat, while those due to strain may fade in time. Internal strains when in moderate degree may either increase or decrease the tensile strength of steel, as shown by many tests of steel in which annealed bars sometimes show higher, but usually lower, tensile strength than the unannealed.

That strains in hardened steel are of a quite different nature from those in cold worked steel may be shown by the attraction of a magnet. A piece of hardened steel with and without intense strains acts very differently from a piece of wire drawn steel with and without strains when its attraction for or by a magnet is measured. A file in a hardened condition, which gave a pull of 12 oz. with a common horseshoe magnet, gave, after being heated to the blue heat, a pull of 27 oz., and after being heated red hot and slowly cooled, 31 oz. The magnet gave on its keeper a net pull of 43 oz. Tenpenny wire nails have with the same magnet an average pull of 27 oz., while similar nails, heated to redness and slowly cooled, an average pull of 24 oz. In the nails the strains seemed to have no effect in reducing the amount of the pull, but, if anything, to increase it. Still, the determination was made by crude means, and cannot be accepted as doing more than indicate the effect of the cold working on this property. The apparatus consisted of a small spring balance, the magnet and pieces under examination.

In the case of the file the question is more complex. If the carbon is not changed in chemical condition by heating to the blue heat, as has been maintained, then the great increase in the susceptibility to attraction by a magnet must apparently be laid to the elimination of strains. If not, then to an allotropic modification of the iron itself.

The British Iron Market Stronger.

Reports from the British iron market show continued activity and advancing prices for pig iron, due to good buying from Germany and to the expectation that the United States will be an importer of British iron. The *Iron and Coal Trades Review* of August 17 says that up to that time neither American inquiries nor orders for Cleveland iron had been received, but an increased inquiry was noticed for hematite, special iron and Scotch iron for the United States. This paper says that "generally when pig iron becomes scarce in America consumers there begin by buying Scotch iron, which is most like their own. There is more probability now than there ever has been for some time of Cleveland iron going in considerable quantities to America."

The advance in Cleveland No. 3 pig iron had carried it on August 16 up to 53 shillings 6 pence, and for September and October deliveries 53 shillings 9 pence had been paid. The feeling was that if orders began to come from the United States the price would not long remain around these figures. East Coast hematite, usually 10 shillings above Cleveland iron, is now relatively higher, the difference being 12 shillings. Producers have been asking 65 shillings 6 pence. The August exports of pig iron from the Cleveland district up to August 15 were 62,259 tons, as compared with 60,398 tons to the middle of July this year and 47,493 tons to the middle of August, 1905.

Rubio ore is advancing, the Spanish mine owners keeping a close watch on the pig iron market. Most sellers are now asking 20 shillings per ton, c.i.f. Tees. Negotiations are in progress for the reopening of a number of Cleveland iron mines in response to the increased demand for ore. The Consett Iron Company recently received the first iron ore briquettes from the Dunderland Iron Ore Company's plant at Guldsmedvik i Ranen, Norway. The results in furnace operation have been satisfactory, and further cargoes will be received. These briquettes are expected to sell at 20 shillings per ton, delivered at ports on the northeast coast.

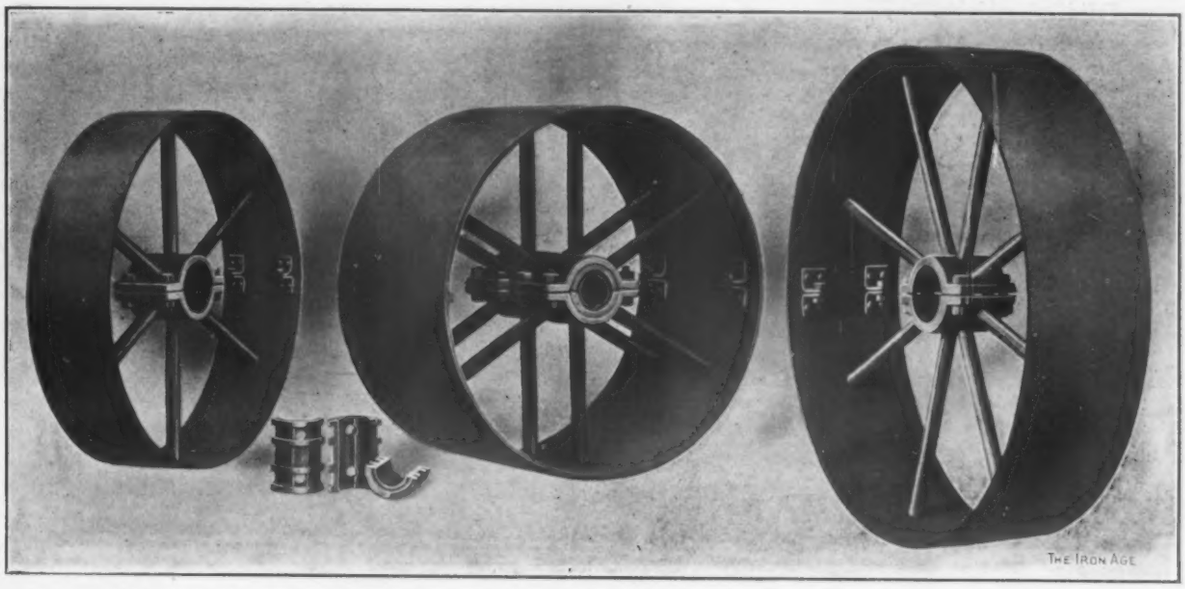
The finished iron and steel trade in Great Britain shows improvement in several branches, but no advances in prices have been made as yet. It is stated that manufacturers are making better profits than at any time since 1900, and in a number of instances dividends have been increased. Richard Hill & Co. have paid 10 per cent., as against 3 per cent. last year, and Bolckow, Vaughan & Co. 6 per cent., against 5 per cent. last year, besides spending £106,000 out of the past year's profits for improvements.

The International Railroad Master Blacksmiths' Association, in convention at Chicago last week, made an inspection on Thursday of the plant of the Columbia Tool Steel Company at Chicago Heights, Ill. The party, numbering about 65, left Chicago at 1.30 in the afternoon, and upon reaching the plant luncheon was served. Following a visit of the plant, E. T. Clarage, president of the company, delivered an address, which was responded to by Mr. Swinton, ex-president of the association, who thanked the company for the privilege of going through the plant. Officers have been elected by the association for the ensuing year as follows: President, J. S. Sullivan, Columbus, Ohio; first vice-president, G. H. Judy, Glenwood, Pa.; second vice-president, J. W. Russell, Renova, Pa.; secretary and treasurer, A. L. Woodworth, Lima, Ohio; chemist, G. H. Williams, Boston, Mass.

The Latshaw Steel Split Pulleys.

Several months have been spent in experimenting with and equipping a plant for the manufacture of the steel split pulleys of the type illustrated, and made by the Latshaw Pressed Steel & Pulley Company, Pittsburgh, Pa. Of the construction of the pulley little description is necessary, for it is remarkably simple and easily understood from the engraving. The materials used and the objects sought are all that require further explanation.

The main aims were to produce a pulley mechanically correct, light, strong, simple and safe. The pulleys are made throughout of a special grade of mild steel and are adapted for either single or double belts. Being made in halves they may be applied without stripping the shaft, and they are held to the shaft by compression only. An ample number of compression bolts is provided, and each bolt is close to the shaft where it has the greatest effect. The saving in weight is an important advantage, as these pulleys weigh only about half as much as cast iron pulleys of the same corresponding sizes. The parts are



Six, Twelve and Eight Arm Types of Steel Split Pulleys Made by the Latshaw Pressed Steel & Pulley Company, Pittsburgh, Pa.

few and are simple, compact and strong. The arms are solid bars secured to the rim and hub without rivets, so that the danger of sheared rivets is removed, and with it the likelihood of the pulley coming apart. The rim of each half section is one piece of solid steel, and is claimed for that reason to be much better adapted to pulley service than if it was made of two thicknesses of thin sheets of metal. The rim presents the same belt surface as a turned cast iron pulley. The hub is heavy enough to allow the proper support for the compression bolts, and is so designed that it may be tapped for set screws if required.

The pulleys are made in all standard sizes from 12 to 50 in. diameter, and all standard widths from 3 to 24 in., with crowned or straight faces. The six-arm construction, shown at the left in the illustration, is used on pulleys from 12 to 28 in. in diameter, inclusive, and 3 to 12 in. width of face, inclusive. The middle view shows a 12-arm construction for pulleys of the same range of diameters, but for widths of 14 to 24 in., inclusive. This construction, it will be noticed, is practically identical to that of two pulleys of six arms each, placed side by side with their rims continuous. The eight-arm construction, shown on the right of the engraving, is used on pulleys of from 30 to 50 in. in diameter, inclusive, and 4 to 12 in. width of face, inclusive. A 16-arm construction, not shown, is for pulleys of the same diameters as the eight-arm pulleys, but of 14 to 24 in. width of face. The 16-arm pulley bears the same relation to the 8-arm pulley that the 12-arm does to the 6-arm type. The use of two sets of arms on all pulleys of 14 to 24 in. width of face removes the danger of collapse in wide face pulleys. The pulleys are furnished with interchangeable metal bushings to fit different shaft sizes.

The peculiarly simple design of the pulley, the large stock of finished and partly prepared material kept on hand, and the company's special machinery and factory arrangements, enables it to build special designs of split pulleys on short notice. A complete stock is carried by all of the company's agents of 3½ and 4½ in. bore pulleys in the most commonly used sizes.

Welsh Charcoal Tin Plates.

Writing on the subject of charcoal tin plates, Consul D. W. Williams, of Cardiff, says there has been no charcoal blast furnace operated in Wales for a century and a half. He continues:

"They were shut down one by one on account of the disappearance of the forests, and the last of any importance, that at Hirwain, near Merthyr-Tydfil, went out of blast about 1750. But charcoal iron, used as a base for tin and terne plate, was made in forges until a decade or two ago. The last forge in the forest of Dean was dismantled about 1886, and the last of any importance in Wales was closed about 1890. The result is that no pure charcoal iron is now made in Wales. It is reported, further, that no tin plates are made from pig iron manufactured in Wales, and to my knowledge there is only one firm in England which makes pure charcoal iron sheets and plates, and this firm at Stourport is said to use all of its own product.

"About two years ago two companies endeavored to revive the manufacture of charcoal terne plates in Wales, in order to supply an American demand, but the attempt was given up. It is confidently asserted that no roofing plates are made in England or Wales from pure charcoal iron. The degree of prosperity enjoyed by the tin plate trade in this country is dependent in a measure upon the importation of steel from other countries. Oddly enough, the lower price at which these importations are secured enables the trade to compete with the foreign manufacturers of tin plate. The imports of steel bars and billets into this consular district during the year 1905 amounted to about 146,840 tons, of which 50,840 tons came from the Continent and about 96,000 tons came from the United States."

The Lalance & Grosjean Mfg. Company's tin plate mills at Harrisburg, Pa., have started after a six weeks' shut down.

A Large Electric Steel Plant for Sweden

Stockholm correspondence of the *Gazette*, Frankfort, Germany, refers to the probability that the Kjellin electric furnace for the production of steel will be utilized on a large scale in Sweden. It is stated that a number of capitalists have laid before the Government a proposition to organize a stock company to make steel under the Gröndal-Kjellin patents, provided the Government will develop the immense water power at the Tralhätta waterfall, and also that in the Province of Norrland, in which there are extensive ore deposits. It is proposed to lease these water powers from the Government, and to produce steel in such quantities as to make Sweden a steel exporting country. The power from the Tralhätta Fall will be brought to a point near Gothenburg, where a steel plant producing 500,000 tons yearly, according to the sanguine claims of the promoters, will be established. The works in Norrland will have about the same capacity. The two, it is claimed, will be able to supply all the steel required for home consumption, and it is hoped, owing to the cheapness of the method of production, that electrically made steel will find a market in foreign countries. The Government has accepted the proposition, and has decided to commence work to develop power at the Tralhätta Fall. It is expected that 10,000 to 15,000 hp. will be available there as early as the year 1908. The new company has been given the title "Metallurgiska Patent Aktiebolaget." The Krupp Works is reported to have acquired the Kjellin patents for Germany, and it is proposed to erect a plant for their utilization.

The London *Engineer* cites as proof of the progress made by the German iron industry the fact that the number of the workmen has not risen in proportion to the increase of the production. In 1895 the production amounted to 5,500,000 tons, and the workmen numbered 24,059; in 1904 the production had risen to 10,000,000 tons, and the number of the workmen only to 35,284. In 1895 the quantity produced per head of workmen employed amounted to 227 tons; in 1904 it had risen to 283 tons. Thus the number of workmen increased during the decade by 47 per cent., while the quantity produced increased by 84 per cent.

The Illinois Steel Company's Warehouse.

Concurrent with the increasing use of steel for building purposes there has developed a proportionate demand for immediate shipment of shapes, plates and bars cut to length, and to meet these requirements warehouses carrying large stocks of assorted sizes, adequately equipped for cutting material, have been established by several large distributers. A few of the rolling mills have likewise added facilities to meet the needs of this trade, while practically every structural fitting shop in a limited way caters to this demand, and many foundries have also found this a profitable venture.

Without exception the largest warehouse of this kind in the country is maintained by the Illinois Steel Company at its North Works, Chicago. It has a capacity of 40,000 tons of beams, channels, angles, bars and plates, and during the past few months, notwithstanding the difficulties encountered in securing deliveries from the mills, there has been an average daily stock of 20,000 tons on hand. A structural fitting shop, with an output of 3000 tons a month, is also one of the component parts of this plant, which had its origin in 1857, but has undergone many changes since it was built. Two blast furnaces, representative types of early practice, operating at their capacity on account of the pressure on the more modern plants of the company, and a cement works, are the only remaining units of what was formerly one of the most noteworthy self-contained steel works in the West, but the upbuilding of the South Works at South Chicago ended the usefulness of the rolling mills and converters several years ago. With the removal of these departments increased facilities were provided for storing material for the fitting shop, and in a modest way the sale of sections of varying lengths to meet local demand was begun.

So rapid, however, has been the growth of the warehouse business that it now overshadows all of the others in the group, and is crowding them hard for additional room for extensions. Shipments, which in the beginning were made by wagon to the city trade only, now go to every State in the Union, as freight charges are matters of minor consideration when material must be had on time limit building operations and bonus or forfeit con-

Fig. 1.—General View of the Illinois Steel Company's Warehouse at Its North Works, Showing Cutting Tools.

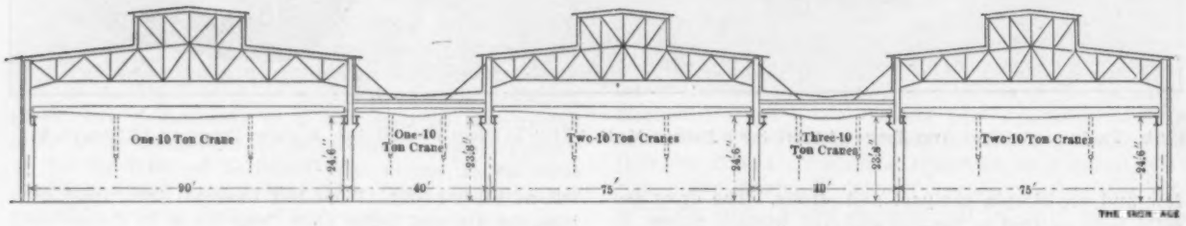


Fig. 2.—Cross Section of the Illinois Steel Company's Warehouse at Its North Works.

tracts when the mills fall of delivery. The crowded condition of steel works and accompanying deferred shipments have been powerful factors in developing the trade in the past few years, although there has been a marvelous growth in the number of small orders from contractors and builders, who have learned from experience that their requirements can be met in from 24 to 48 hours, and are thus supplanting wood with steel.

Quick shipment orders running into hundreds of tons are by no means out of the ordinary, and are naturally more numerous during periods of abnormal activity in the steel trade than when fairly prompt deliveries can be secured from the mills. The steel manufacturers, on the other hand, are relieved of the multiplicity of small orders, which were frequently held up for months dependent upon the rolling programme if the specifications provide for varying sections of assorted sizes. The ease with which steel can be secured is also leading to the rapid displacement of cast iron for building purposes, and manufacturers of heavy machinery find it to their advantage to use steel sections for parts for which the gray iron foundry was formerly depended upon.

The warehouses adjoin the fitting shops at right angles, the latter opening into one end of the former to facilitate the delivery of material to this department. The stock is carried under roof in what is practically one building of steel construction, divided into five bays. A general view in this building is given in Fig. 1, showing a number of the cutting tools, while Fig. 2 is a cross section. Protection is thus afforded from the weather, as no material is stored in the open and the steel is almost in as good condition as regards oxidization as when it was shipped from the mill. The material is handled and transferred by nine electric cranes, built by the Whiting Foundry & Equipment Company, Harvey, Ill., distributed according to the varying lengths of the bays. They are each of 10 tons capacity, and each is provided with two 5-ton hoists. By the use of these hoists the material is lifted at either end and can be rapidly carried without danger of slippage, which always attends the handling with only one chain.

In the first bay, Fig. 3, which is 75 x 425 ft., is carried the stock of wide plates, angles, Z bars and tees. It is served by two cranes running its entire length. The

Fig. 3.—Bay of Illinois Steel Company's Warehouse, Containing Stock of Plates.

Recent extensions at the North Works, which have just been completed, have practically doubled the storage capacity, increased the handling facilities and added approximately 66,000 sq. ft. of floor space. W. H. Pratt, the general superintendent, styles his plant a "steel lumber yard," and paradoxical as it may seem, it fittingly describes the trade engaged in. In making a comparison with the lumber industry the rolling mill occupies an analogous position to the sawmill; the fitting shop to the planing mill, and the steel warehouse to the lumber yard. In this warehouse the steel sections are piled in a manner similar to lumber in the lumber yards, and likewise sections of varying lengths are sold to meet the demands of what can be properly termed a retail trade.

An average of more than 2000 orders a month of an average quantity of only 2.3 tons is indicative of the widespread demand, and while many specifications are for car lots and over, three-fourths of the orders are for less than 1 ton. In cutting material to length the item of scrap or waste is no small factor, and with the aid of his experienced corps of workmen Superintendent Pratt has succeeded in reducing this to only a fraction of 1 per cent. Naturally this can only be accomplished in a plant handling a large tonnage and where the sections as they are received from the mills can be cut up to the best advantage, owing to the great diversity of lengths required. tees and angles are received in 60-ft. lengths and the width of the bay provides ample room for passage on either side of the material when piled. Plates, tees, rounds, squares and the crops or shorter sections of all shapes are stocked in the adjoining bay, which is 40 x 550 ft., and is commanded by three cranes traveling its entire length. A section of its west end is devoted to the leading of material on wagons for local shipment. All of the merchant bars in this section are received from the mills in lengths of 30 ft.

Beams and channels are carried in lengths of 60 ft. in another bay, Fig. 4, which is 75 x 615 ft., and is served by two traveling cranes. The east end of this building is used for marking material for the fitting department and for making templates, although this work will be transferred to the template building upon its completion. It will be two stories high, 60 x 100 ft.

In an adjoining section, 40 x 215 ft., commanded by one crane, merchant bars of such sections as are largely used by the structural trade are carried in lengths of 30 ft. An addition recently completed, 90 x 215 ft., is to be devoted to the stocking of beams 60 ft. and over. It is probable that the sections will be received from the mills in 75 ft. lengths, as greater economy in cutting can be effected. A friction saw is now being installed in this bay, similar to the one located in the section

where beams and channels are carried. These saws have been designed by the company's engineers, and differ materially from other types in use. The upper section, which carries the saw blade, moves on guides over a supporting bed, while the material to be cut rests on a stationary bed. The saw is moved against the material by means of a compressed air movement, regulated by a piston passing through the cylinder bed, fed with oil. The saw, which travels at the rate of 2000 rev. per min. and has a 38-in. stroke, is belted to a 150-hp. motor.

The other equipment consists of one single and one double angle shear, a plate shear with a 10-ft. blade and 5-ft. straightening rolls, located in the bay in which this material is carried. Two 5-ft. plate shears are also conveniently located, as well as a gag straightener.

To distinguish the Bessemer and open hearth steel, the ends of the sections made from the former are painted white and the latter yellow. Complete records of the chemical and physical analyses of all the material received are kept, and the heat numbers are stamped on each piece. A chemical laboratory is also maintained for checking the tests furnished by the mills, if desired by the purchaser, and an Ohlsen testing machine of 200,000 lb. capacity is also available for physical tests.

A new office building, 40 x 150 ft. and two stories high, has just been completed, and the large drafting rooms on the second floor will afford ample room for the large corps of draftsmen constantly employed. The building is of brick and steel construction and has a commodious basement with ceiling well above the general level. Further additions to the warehousing facilities are in view, with extensions to the bays that will make them all of practically equal length.

Fig. 4.—Bay of Illinois Steel Company's Warehouse, Containing Stock of Beams, Channels and Angles.

Cement production increased heavily in 1905, according to the report prepared by E. C. Eckel, of the United States Geological Survey. The output was 40,102,308 barrels against 31,675,257 barrels in 1904, thus showing a gain of 8,427,051 barrels, which is by far the largest growth of the industry in a single year. The production in 1905 was classified as follows: Portland cement, 35,246,812 barrels; natural rock cement, 4,473,049 barrels; puzzolan cement, 382,447 barrels. It was made in 11 States, Pennsylvania far surpassing any of the other States in the quantity turned out. New Jersey, second in production, made only a little over one-fourth as much as Pennsylvania. In 1900 the output of the United States was 16,865,539 barrels. Thus in five years this industry has shown a growth of almost 140 per cent.

The Importance of Good Foundry Facing.

Under the heading, "Notes on Car Wheels," in a recent issue of the *Engineering and Mining Journal*, Reginald Meeks draws attention to the importance of using good foundry facing made from sea coal low in sulphur, and limiting the use of excessive quantities by the molder. It is explained that sea coal derived its name from the fact that long ago in England the coal used for facing was obtained from the seacoast. According to the author's observation, facings are now made sometimes from bituminous coal analyzing nearly 2 per cent. sulphur, and in support of his contention that it should not be used on account of the danger of weak castings resulting, he cites some interesting experiments.

Cast iron car wheels made with this poor facing were subjected to chemical analyses, samples being taken from a point in the "single plate" over the bracket on the cope or face side of the wheel where the most facing is used; from a point in the bore of the hub, where no facing being used the wheel is least likely to absorb sulphur, and from test pieces cast at the same time as the wheels and with absolutely no facing. The following gives the results from six different wheels tested:

	Sulphur Per Cent.		
Wheel.	Plate.	Hub.	Test bar.
No. 1	0.245	0.215	0.198
No. 2	0.239	0.215	0.202
No. 3	0.262	0.216	0.206
No. 4	0.236	0.208	0.198
No. 5	0.239	0.214	0.188
No. 6	0.241	0.224	0.183
Average	0.244	0.215	0.196

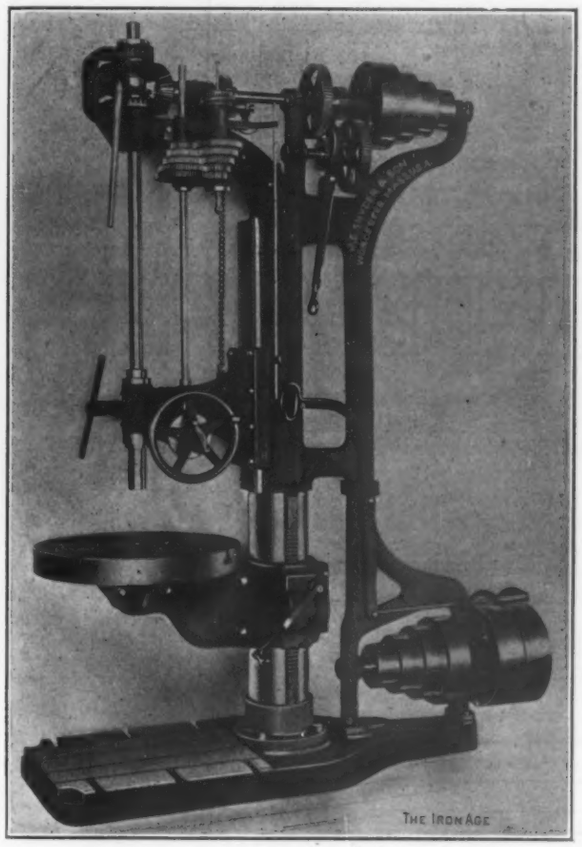
In every instance the sulphur in the bar was lower than in the hub sample, while the plate showed considerably more than either, making it plainly evident that the high sulphur in the plate was due to absorption. This part of the wheel being structurally the weakest, it is apparent how important it is to keep down the weakening influence of sulphur in the facing by carefully checking all purchases of such material and watching the use of it by the molders.

The Meyersdale Sheet Steel Company's plant at Meyersdale, Pa., will be sold by the sheriff at Somerset, Pa., on Friday, September 7, at 1 o'clock. The equipment comprises one double annealing, two heating and two sheet furnaces and three sheet mills. The mills consist of two 26-in. hot and one 20-in. cold rolls.

The Snyder 30-In. Vertical Drill.

The 30-in. upright drill shown in the illustration is of a new gear feed type furnished with tapping attachment, and is manufactured by J. E. Snyder & Son, Worcester, Mass. It is a powerful machine, and is especially adapted for boring and for jig work because the head can be instantly adjusted to any point on the column by the quick return handle. An important characteristic of the drill is the sliding head which travels with the spindle, affording great rigidity at all stages of the work, the distance from the point of the drill to the bearing in the head being constant. Consequently, as the work proceeds it is always with greater rigidity, affording an accuracy which is especially important in boring. The head is held on the ways by square gibs and is actuated by a steel pinion on the side shaft, traveling in a steel rack on the side of the column. The automatic drilling capacity of the machine is the full length of the face of the column, a distance of 27 in.

Eight changes of speed are obtained, four direct from



A New 30-In. Upright Drill with Tapping Attachment, Built by J. E. Snyder & Son, Worcester, Mass.

the cone pulley and four through back gears that are thrown in and out by the lever seen in the illustration, which operates a clutch on the driving shaft. Five changes of positive power feed are obtained, all of which can be made instantly at any time without stopping the machine. The automatic feed is easily thrown in and out by an interlocking device at the hand wheel, consisting of an eccentric handle in connection with bevel gears. In addition there are three other ways in which the power feed may be stopped in case of emergency from different points of the machine—by a quick return lever on the left side, which operates a pawl gear or ratchet in the gear on the side shaft; by the clutch in the tapping attachment, and by the lever which stops the machine by throwing the driving belt on the loose pulley.

The Chesapeake Nail Works at Harrisburg, Pa., will resume work in September.

The Incorporation of Trade Unions.

The Massachusetts Bureau of Statistics of Labor issues as Part III of its annual report for 1906 a pamphlet of 118 pages entitled "The Incorporation of Trade Unions." The Bureau sent a number of questions to four classes of persons—employers, labor leaders, lawyers and "the public." The last named class was made up largely of college presidents and professors and editors. Of 963 letters sent out, replies were received from 301, this number being made up of 96 employers, 81 labor leaders, 71 "public" and 53 lawyers. After printing the substance of the replies, the report gives this summation of the results of the inquiry:

Employers believe that trade unions should incorporate because the better class of members would be individually active in the management of the union for the purpose of conservative action leading to continually increased strength in their standing before the community.

Labor leaders, on the other hand, believe that trade unions should not be incorporated because the individual member would be held responsible for the actions of the organizations, also because the organizations would be held responsible for the action of the individual member, or, in other words, the responsible members would be liable on account of the irresponsible ones. They are further opposed to incorporation for the reasons, as they advance, that their funds would be liable to attachment, and that manufacturers would possess more power in the courts than the unions because they could employ the best available legal talent to advance their claims.

The public view is that incorporation is desirable both from the standpoint of the public and unions, for, while it might limit to a certain degree the freedom of action of the unions in ways which do not now exist, and at times the unions might be embarrassed by legal proceedings directed against them, these disadvantages would be more than offset by the greater willingness of their employers to deal with the unions when they feel that the unions are legally responsible bodies. In view of certain decisions of the courts it is thought that the responsibility desired may already exist, but there would be no doubt about it if the unions were incorporated.

The legal profession, which is perhaps in a better position to judge impartially of the matter than any other, for the reason that it may have as clients both employers and employees, is of the opinion that it would not be inimical to the interests of trade unions to be incorporated. The legal profession declares the difficulty with trade unions at present to be their irresponsible character. It is claimed they frequently fail to show any regard whatever for their agreements, which is the first essential in commanding public respect. Incorporation would mean responsibility, and actions by responsible unions would be accepted as a pledge of good faith by responsible employers.

To the question "Would the incorporation of trade unions under a general law similar to the general corporation law be inimical to their interests," 12 employers, 42 labor leaders, 13 "public" and 8 lawyers answered Yes, while 30 employers, 11 labor leaders, 34 "public" and 30 lawyers answered No. To the question whether it would be legal, if possible, to have the strike funds placed in the hands of trustees and thus kept from attachment, 11 lawyers answered Yes and 11 lawyers answered No. To the question whether it is not anomalous to have one party to a contract, in case of industrial agreements, with financial responsibility fixed by law while the other has no such responsibility, an affirmative answer was given by 32 employers, 15 labor leaders, 25 "public" and 26 lawyers, and a negative answer by 4 labor leaders and 3 lawyers. The question whether, if trade unions are incorporated, manufacturers' and dealers' organizations should not be also, 25 employers, 14 labor leaders, 10 "public" and 17 lawyers answered Yes, while 6 employers, 5 labor leaders and 8 lawyers answered No.

The Moran Company, Seattle, Wash., has the contract for building a steel schooner for the Northwestern Steamship Company. The dimensions of the boat will be: Length, 284 ft.; breadth, 42 ft.; depth, 24 ft.; capacity, 4000 tons. The engines will be of the triple expansion type, and the cargo handling equipment will be capable of dealing with the heaviest classes of freight.

Examinations of the old Anvil furnace at Pottstown, Pa., have been made by engineers, and it is said that the stack is being considered for starting. It has been idle since 1893.

The Cleaning of Blast Furnace Gas.*

BY F. E. JUNGE, NEW YORK.

Methods and means of conserving and protecting the natural resources of a country, or the products gained from their transformation, are as important for establishing and maintaining commercial superiority as are the ways and processes of acquiring them. Therefore, economy has become a potential factor in the industrial pursuits of our age, and efficiency the guiding principle of energy utilization, regardless of whatever special form the latter may assume. Of the various industries which have profited by the elaboration of economic methods of power generation, the iron industry has been by far the most favored, since it was the first practically to explore and utilize the many advantages that are inherent in the application of gas power, and since its principal factor, the blast furnace, combines in a simple and most efficient manner both the processes of reducing the ore and of generating the power that is necessary for carrying out the entire series of converting and finishing processes, which transform the original ore into marketable steel products.

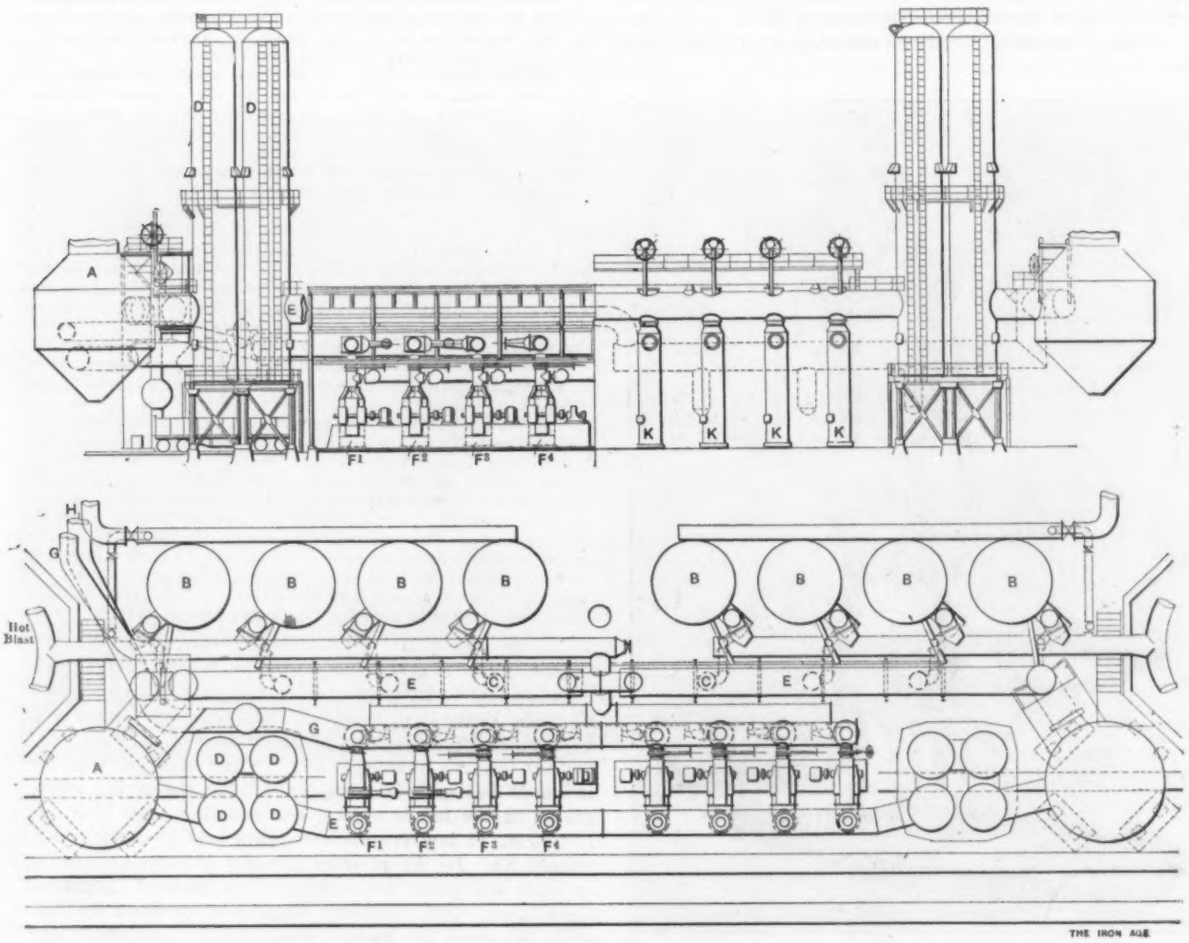


Fig. 1.—Gas Cleaning Plant of the Lackawanna Steel Company for Its Large Furnaces.

Increasing Fuel Consumption Must Be Counteracted.

Besides the ever active element of foreign competition which forces the ironmasters of every progressive country to unceasing new efforts, the American iron industry has had another growing factor to contend with in recent years, and one that calls more imperatively than any outside influence for a reduction of waste, namely, the ever increasing consumption of fuel in the blast furnace. While in 1880, in the best practice, the amount of coke required for the production of 1 ton of pig iron remained within the moderate limits of 1760 to 1870 lb., it is interesting to observe that this condition has been considerably shifted within the last 25 years, since, according to recent reports, from 2420 to 2530 lb.—that is, nearly 300 lb. over 1 gross ton of coke—has to be expended per ton of pig iron in the blast furnace, and it is quite likely that this quantity will even be increased in future operations.

The reasons therefor are found to rest mainly with the declining quality of the ores, the metallic contents of which are inferior by nearly 10 per cent. to former values. At the same time the quality of the coke has noticeably decreased, but it is hoped that the growing introduction of retort coke ovens and the utilization of by-products now almost universally adopted in Europe will eventually overcome this defect. The mechanical distributing and charging devices, which serve to feed the ore and the fuel to the blast furnace, have also introduced new difficulties and losses, which up to this date have not yet been successfully corrected.

It is obvious that these deficiencies and their influence on fuel consumption, and therefore on the cost of pig iron production, will be the more felt the farther an iron smelting plant is located from the coal districts, and the more the factor of transportation, with its accompanying considerations of freight car rates, car famine and other incidentals enters the problem.

Many Improvements Now Being Made.

As was said before, all these causes have contributed to direct the attention of American iron masters more toward the adoption of modern methods of production. The introduction of the Gayley system of dry air blast and of various improvements in the manner of automatic ore feed are visible indications to that effect. Since the return of the committee which was sent out by the United States Steel Corporation to study the application of gas power in the European iron industry, and on the basis of its favorable report, much headway has also been made in the utilization of waste blast furnace gases for operating blowing engines and engines for driving rolling mills and central stations, and which is by far the most important of all methods that are available for decreasing

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the cost of production on account of the enormous savings that can be effected. This was shown in *The Iron Age* in an article on "Gas Power Economics," wherein the actual results from various Continental gas driven iron smelting plants proved to effect a net reduction of operating cost of about two-thirds against what was originally obtained when steam power was employed.

The Cleaning of Gas Essential.

It is the object of this article to study in detail an interesting and important feature of gas power application, namely, the cleaning of the power gas, which unfortunately has not received in this country the attention which it deserves, yet which is as essential for the continuous and economical working of a gas power plant

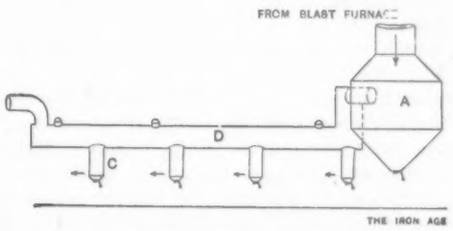


Fig. 2.—Details of Stump Pipes.

as are the elaboration and standardization of modern method of engine design, of which I have treated on another occasion.

While the advocates of gas power application are very apt to refer to the thermal inferiority of the steam engine whenever they compare the commercial prospects of respective installations, they never stop to point out the superior qualities of steam as an energy transforming medium. Nor do they try to realize or learn from the experience gained through the employment of such a perfect working fluid in the prime mover, nor to adopt those fundamental principles and improvements which in the evolution of steam power plants have now become absolutely indispensable and standard features. Even though steam is an ideal working fluid of fixed physical and chemical properties, which have now been accurately determined by scientific theoretical and experimental investigations, within the commercial temperature limits, it has proved an absolute necessity to provide for efficient means of guarding against boiler scale, of eliminating impurities contained in the feed water, of supplying dry steam to the engine cylinder by extracting the water and preventing condensation, of separating the oil from the steam, &c., and no engineer would regard a modern steam plant as up to date and complete which lacks these purifying and cleaning devices and which are a necessary addition to the plant, no matter how perfect the boiler and how efficient the engine.

Complexity of the Gas Problem.

In the working process of gas power plants, which is characterized by the direct transformation of gas into work without the intervention of the comparatively inefficient boiler equipment, we employ a working medium that is produced by a very complex process of gasification either in the blast furnace, the coke oven, or the ordinary producer, and from various fuels. This gas when generated changes its composition, temperature and volume according to the manner of feed, the quality of fuel, the degree of moisture supplied with the air, the kind of load and other influences. It also carries with it from the source of generation to the place of utilization a considerable quantity of dust, water vapor, tar, sulphur and other impurities, which further complicate the nature of the medium and the process of its transformation into energy. Besides all this, it is necessary to admit for every condition of load and for every individual position of the governor a certain quantity of air to the gas, which varies its temperature and composition with the atmospheric conditions of the season and its density with the altitude of the respective location. For it is only thus that we can secure a corresponding invariable equivalent of work produced, no matter how often or how long this position is occupied. Nor is this uncertainty of operation concluded in the engine proper, as such a constantly changing mixture of gas and air and their unstable and other constituents has to be ignited in the cylinder, and it is known that the rapidity of flame propagation, inflammation and combustion is again dependent on composition, calorific value, temperature and compression of the charge, and also on the condition, energy and efficiency of the electric sparking device and other items which it is of no value here to consider.

Finally, while steam as a working fluid retains during utilization its chemical properties and only changes its physical relations of temperature and pressure, the gaseous mixture of internal combustion engines undergoes during the process of energy transformation in the cylinder a complete change of both its physical and chemical properties, such change increasing the number of solid and gaseous by-products and impurities contained in the working fluid.

A Frequent Cause of Breakdowns.

With all these facts in mind it is surprising to see the attitude of indifference and negligence with which both manufacturers of gas producers and engines, as well as the consumers of gas power, continue to treat the question of gas cleaning, which, of all the various factors considered as complicating the problem of utilizing gaseous fuels by internal combustion in engines, is the only one that we can positively master by adopting scientific and efficient methods of purification. This attitude of the trade cannot be possibly based on ignorance of the actual conditions, as these have been demonstrated time and again by serious breakdowns which, though frequently occurring, are never—and for obvious reasons—revealed to the eyes of the buying public. Nor do the power consuming circles take pains, through impartial and expert investigation, to ascertain the actual state of affairs and

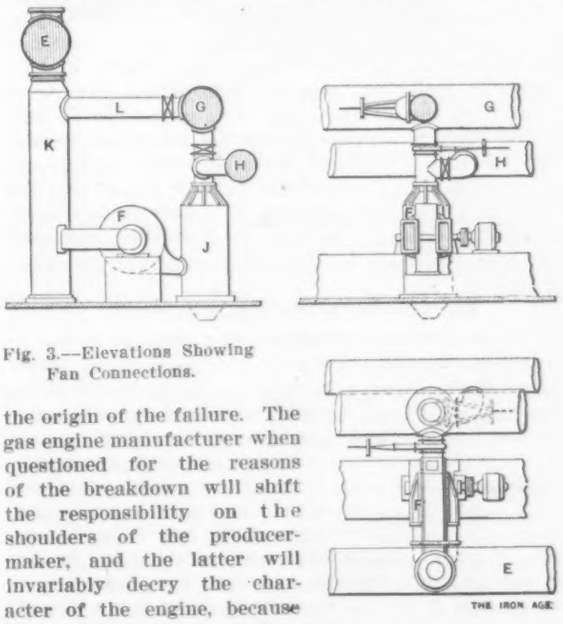


Fig. 3.—Elevations Showing Fan Connections.

the origin of the failure. The gas engine manufacturer when questioned for the reasons of the breakdown will shift the responsibility on the shoulders of the producer-maker, and the latter will invariably decry the character of the engine, because it cannot without serious troubles digest the dirt which his producers supply together with the gas. Both fail to inform their clients, when inquiring for details on the respective apparatus, that in addition to buying their excellent producers and engines it will be necessary to invest in an efficient cleaning plant, which is indeed the only real safeguard and guarantee they can get that the prospective gas power plant will do the required work continuously. A similar condition of things holds true in blast furnace and coke oven practice, and in every single instance of a breakdown of this kind the power consumer has yet had to pay the bill.

This is a deplorable state of affairs, and one that cannot be too severely criticised, since it has cost the American gas engine industry already a good part of its prestige, and has seriously hampered more universal progress by undermining the confidence of the purchasing public in the reliability and economy of this modern form of power generation.

The Lackawanna Gas Engine Installation.

We have only to study the results effected by inefficient methods of gas cleaning in some cases taken from actual practice, and which have been confirmed by the experience of several years, in order to become convinced that we must devote more careful attention to this feature. What is regarded as one of the largest gas power plants, and certainly the most remarkable of its kind in this country, is the 40,000-hp. gas engine installation at the works of the Lackawanna Steel Company, Buffalo, N. Y., where the available blast furnace gas is utilized for driving both the blowing engines, which serve to compress the air that is afterward used in the reduction process of the blast furnace, and the three-phase current generators in the electric central station, operating in parallel. The engine part of this plant has been described in the technical press, so that it is hardly necessary to be discussed again at this time. What interests us most is the gas cleaning plant which is shown in the accompanying illustration.

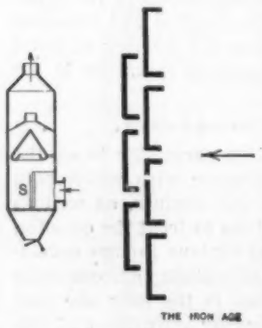


Fig. 4.—Details of the Scrubber.

The provisions which were originally made for purifying the gas when the engine plant was first put in operation were very poor, indeed absolutely inadequate, as there was at that time a current belief among gas power engineers that the scrubbing difficulty was a mere imagination, and that the fine silicious or other dust with which the gas was laden would readily and without trouble go through the engine, especially if the latter was of the Koerting two-stroke cycle type, having no exhaust valves to contend with and where all foreign matter is expelled through the exhaust ports. As a matter of fact, there was until very recently little actual experience available on this question, and also on systems of cooling and washing the gas, at least not for plants of such magnitude and for ore of the composition used at the Lackawanna plant. Experience has now proved that the treatment of the dust problem is entirely dependent on the quality of the ore which is being smelted, and so it was found necessary to afterward install the gas cleaning plant.

The Lay Out of the Cleaning Plant.

The gas generated from two blast furnaces is sent to a common cleaning plant located between them. Eight water spraying towers of the Koerting system, together with eight centrifugal hydraulic fans working with water injection and arranged in groups of four, serve to carry out the three processes which are essential for purification, namely, the cooling, washing and moving of the gas. Fig. 1 shows the larger of the two plants which handles the gas of two blast furnaces of 700 tons daily capacity each. The gas is taken off at three points of the furnace top and conducted through a vertical down draft pipe to the dry dust catcher A, which is supposed to act through the retarding effect of its large volume on the speed of the gas flowing through, thereby allowing the solid particles of the dust to separate from the gaseous molecules by gravity. A certain quantity of the gas generated in the blast furnaces is required for heating the hot blast stoves B, which serve to preheat the air that is used in the reduction process of the furnace, such quantity varying from 25 to 30 per cent. of the total, according to the degree of purity of the gas, the construction of the stoves, and the conditions of operation of the blast furnace plant in general. In the plant under discussion this portion of the gas goes directly to the hot blast stoves without being subjected to any kind of treatment, so that almost the whole quantity of dust is carried with the gas into the stoves, where it settles down and accumulates in the flues, thereby necessitating a considerable expenditure of manual labor every few days for its removal, besides detracting greatly from the heating qualities of the gas. Practically the only provisions made to arrest the dust on its way to the hot blast stoves consist in eight stump pipes C branched to the main E, and which the gas on its way to the stoves has to pass. Thus by changing the direction of flow it gives off some more of the dust, which may be removed through cleaning doors at the bottom of pipes C. This is shown in detail in Fig. 2.

Cooling Towers and Hydraulic Fans Used.

The rest of the gas, including that portion which is used under boilers for raising steam, is subjected to a more efficient cleaning process by passing it in succession through the cooling towers D, of which there are two groups of four towers each, one for each furnace, as shown in Fig. 1, and which are equipped with Koerting spraying nozzles and have shelves arranged, forming successive compartments which the gas has to pass, thus becoming enriched and saturated with water vapor. This mixture of gas, water vapor, dust and steam is then sucked through the main E to the two groups of hydraulic fans F, which are arranged in parallel, but can also be thrown in series if desired.

In these hydraulic fans, which are of the Buffalo Forge Company's make and are of the standard type, having nozzles through which a certain constant quantity of water is injected, the gas mixture is again profusely sprayed with water. Through the centrifugal action of the fan blades the whole mass of gas, steam, water spray and dust is vehemently whirled around, mixed and thrown outwardly toward the delivery side, where it dashes against the fan casing. There is really no time for the separation of the various constituents by gravity or centrifugal force, and it is only that portion of the dust which is absorbed by the liquid water that is actually eliminated from the gas and drained off together with the water at the bottom of the fan casing.

Without trying to construct a speculative theory on the working process that is going on in these hydraulic fan washers it may be said that their efficiency is low, first, on account of the high temperature of the gas, which counteracts the condensation of the suspended water vapor, and second, because the duration of enforced contact between liquid and dust—which is effected on the cylindrical walls of the fan casing—is entirely too short to allow of a thorough absorption of the solid particles by the liquid fluid. Such process can only be executed with

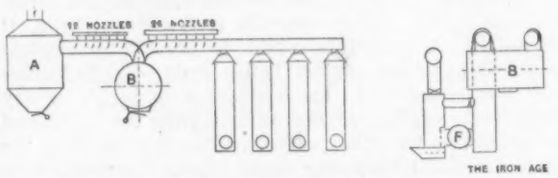


Fig. 5.—Gas Cleaning Plant for the Small Furnaces.

a reasonable degree of efficiency, or, in other words, a fair degree of purity of the gas can be attained by arranging several fans, at least three, in series, so that the gas mixture has to pass through all of these in succession, thereby finding time for gradually cooling down. The cycle of action in such combinations and their deficiencies as regards floor space, water consumption and power required will be discussed later.

After passing through these washers the surplus gas which, of course, has suffered considerable contraction on account of the cooling process, is discharged into two different mains, G and H, of which the first leads to the boilers, the other to the gas engine plant. As can be seen in Fig. 1, all pipings of the gas cleaning plant connect symmetrically to both furnaces in order that the single apparatus may be shut down and by-passed for purposes of cleaning or repairs, without thereby impairing to a great extent the regular and uniform working of the furnace plant. The fans F are connected to the gas conducting pipe as shown in Fig. 3, which gives a front elevation, plan and side elevation of the particular part under discussion. Each fan has a separate inlet pipe coming down from the common gas main, and which can be closed by a valve. From the fans the gas proceeds to a dry scrubber, J, the inner construction of which is shown in Fig. 4. The gas entering the scrubber first dashes against the walls, built of vertical channel beams,

which are superimposed as shown in Fig. 4 in detail, and which serve to retain the major part of the water and dust. Two reversed funnels placed in the upper part of the scrubber are to complete further the drying process. There is another connection made between the vertical downcomers K and the dry scrubber J through pipe L and valves, which allows the by-passing of the gas around the fan if so desired. All gate valves employed in the cleaning system are of 36 in. size except the valves of the fans F^1 and F^2, which are 42 in. Three-phase current motors are used to drive all fans except F^4, which is driven by a direct current motor.

Fig. 5 shows the cleaning plant for the gas coming from the two 300-ton furnaces, which differs from the other plant in so far as employing no separate cooling towers. The gas coming from the dust catcher A is cooled by 12 water spraying nozzles in the overflow pipe, whence it enters the large settling chamber B. On its way to the vertical downcomers it is further washed by 26 water spraying nozzles in the horizontal pipe and then proceeds to the fans, whence it is distributed to boilers and gas engines, respectively, in the manner described.

Purity of the Cleaned Gas.

According to an official statement made by the Lackawanna staff some time ago, the degree of purity of the gas that can be reached with this cleaning plant was shown by its contents of from 0.043 to 0.934 gram (0.663 to 0.524 grains) of dust per cubic meter (35.314 cu. ft.).

It is interesting to observe how often and how widely practical results differ from theoretical assumptions, since at a recent expert investigation made by Professor Lucke of Columbia University on the plant under discussion, to determine the origin of the various troubles that were experienced in the operation of the Lackawanna gas engines, the alarming fact was revealed that in the course of one month's time as much as 10 lb. of solid dust had settled down on the inlet valves of the engines, leaving aside the quantity that accumulates in other parts of the combustion chamber and inlet pipes.

Notwithstanding this extraordinary condition and other difficulties presented in the particular case referred to, by the inability of the operating staff and their unwillingness to learn from the experience of competent authorities and to change their inadequate methods of working, the engines kept running quite satisfactorily, which is an extraordinary and unique performance under the conditions outlined. It was also confirmed that the frequent breakdowns that were encountered, as, for instance, the cracking of cylinder heads, of which one had to be replaced in the plant every month on the average, were due not to deficiencies in the engine system—of which several thousand horsepower do continuous service in Continental iron works—but primarily to the employment of inferior materials and methods of casting, so that it is safe to say that no other prime mover would stand a similar bad treatment and similar severe stresses as does the gas engine plant in question.

Reference to this is made to show that the criticisms of gas engine opponents are absolutely ill founded when directed against the working process or the constructive principles of the internal combustion engine as a prime mover, but that they are entirely justified to decry the negligent attitude of the manufacturers of gas engines and appliances toward the all important question of gas cleaning. No matter how well constructed a power plant may be, nor how elaborate the design of the prime movers employed, it must invariably suffer from breakdowns if we fail to subject the working medium to a thorough treatment of purification before allowing it to enter the engine, regardless of whether steam, water or gas be employed.

(To be continued.)

The insurance loss on the Palace Hotel Building in San Francisco has been adjusted at $1,302,610, and the insurance companies will be called upon to pay $1,265.000, the amount for which the building was insured. This is said to have been the largest loss upon a single risk ever adjusted in this country.

A New Sterling Grinder.

To take the place of the old style grinders, the machine illustrated, which has several new and desirable features, has been brought out by the Sterling Emery Wheel Mfg. Company, Tiffin, Ohio. It is known as the No. 4 grinder, and can be arranged to belt from underneath the floor when desired, or may be driven from an overhead countershaft of the type shown with it in the illustration. The cone pulley on the spindle has two steps, 5 and 3½ in. in diameter, respectively, by 3¼ in. long. The total length of the spindle is 32 in., the distance between the wheels being 21 in. Within the bearings the spindle is 1⅜ in. in diameter, and between the flanges 1¼ in. in diameter. The bearings are 6 in. long, and are provided with self-oiling boxes having large oil reservoirs. The machine occupies a floor space of 25 x 21 in., and its hight from the floor to the center of the spindle is 35 in. The machine is adapted to carry two

The New No. 4 Grinder Built by the Sterling Emery Wheel Mfg. Company, Tiffin, Ohio.

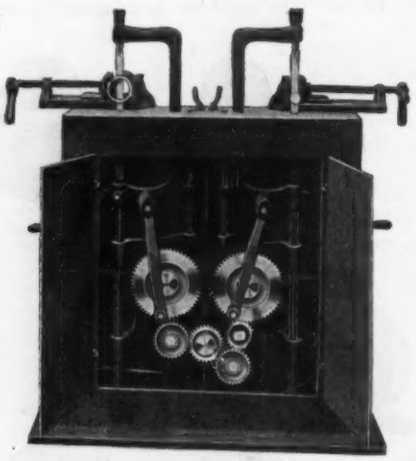
3 x 16 in. emery wheels, and weighs complete, including the countershaft, 530 lb. The countershaft has 3½ x 6 in. tight and loose pulleys, and 11 and 12 x 3¼ in. cone pulleys. It is intended to run at a speed of 450 rev. per min.

Brighton Alloy.—The S. Obermayer Company, Cincinnati, Chicago, and Pittsburgh, after practical experiments with foundry iron, has brought out an alloy named Brighton Alloy, to meet the requirements of foundrymen for positive, quick and safe return of mixtures of iron to their normal state, without the expense attached or delays of procuring the grades of irons to produce the same results. This alloy is added to the iron in the cupola, or the molten metal in the ladle (knowing the component parts of the iron to be treated). It is possible to vary the character of the metal to a nicety in regard to softness, strength and solidity, and of each individual ladle as it is taken from the cupola. This alloy is a perfect deoxidizer, producing soft, solid semisteel castings with the addition of from 15 to 40 per cent. steel scrap, varying according to the character of the castings to be made. The alloy for cupola use is termed No. 1 Brighton Alloy, and for ladle use No. 2 Brighton Alloy Chip. The small proportions to be used, and the fact of being able to use lower grades of iron, or a higher percentage of scrap in the mixture, giving the foundryman absolute control of his iron for the varied work it is required for, is much in favor of its becoming a standard article in foundry practice.

The Central Iron & Steel Company is completing its plans to handle metal direct from its Paxton furnaces at Harrisburg, Pa. The system will probably be put into service this fall when the company's No. 2 Paxton furnace resumes operations.

The Robertson Double Power Saw.

Where economy of floor space is a consideration the machine illustrated is especially desirable, since it embodies two power saws in the space usually occupied by a single saw. It is a new product of The Robertson Mfg. Company, Buffalo, N. Y., and in its construction there are two complete machines, each having a capacity of 5 x 5 in. The column or base is a single casting of box pattern. The pulley shaft is mounted in a long bearing cast on the back, and carries at its outer end tight and loose pulleys for a 2-in. belt. The inner end has a cut gear which meshes with idler pinions engaging with gear teeth on the peripheries of the crank disks. The crank pins on these disks are connected with their respective saw frames by connecting rods. Each frame is supported on a carriage mounted on a large hub bearing



A New Vertical Double Power Saw Built by the Robertson Mfg. Company, Buffalo, N. Y.

which is a part of the back casting. Levers extending through the opposite ends of the column are connected with the corresponding idler pinions brackets for engaging and disengaging the drive from the driving gear to the crank disks. Each is worked independently of the other and stops its saw automatically when the cut is completed.

The arrangement is such that a 4-in. bar can be cut on one saw and a 1-in. bar on the other, or other sizes as desired and vice versa. While the next bar is being set the frame is put back to the starting position, and a grip holds it automatically until ready to start. The vises are bolted to the top of the base and are arranged to swivel to various angles. The top is planed and all parts are machined.

The machine is 31 in. high and occupies a floor space of 12 x 33 in., with its 10-in. pulleys.

The Colorado Fuel & Iron Company's Water Supply.

John Birkinbine, consulting engineer, Odd Fellows' Temple, Philadelphia, Pa., has favored us with a copy of an interesting report made by him on the water supply of the Minnequa Works at Pueblo, Colo. The report, which is addressed to F. J. Hearne, president of the Colorado Fuel & Iron Company, treats of the importance of liberal supplies of water for industries, water conditions in Colorado generally (where the annual rainfall averages but 16 in.), and the special scheme decided upon to supply the Minnequa Works.

When the iron and steel industry at Pueblo was inaugurated, in 1881, dependence was upon an artificial lake of 450,000,000 gal. capacity, covering 185 acres (now designated as Colorado Fuel & Iron Company reservoir No. 1), located about a mile from the plant; the lake being supplied by a ditch line about 12 miles long, drawing water from the St. Charles, a tributary of the Arkansas River. The company subsequently bought water rights—that is, purchased the right to take a specific number of "second feet" from the Arkansas River—but failing to appreciate that the industry would ultimately grow to great proportions, these rights were unfortunately sacrificed. As the iron and steel works developed at Pueblo, it became necessary to procure a larger water supply, and for this purpose two storage reservoirs—one of 500,000,000 gal. (designated as reservoir No. 2), covering 190 acres, and one of 1,000,000,000 gal. capacity (designated as reservoir No. 3), covering 298 acres—were constructed upon the plains 4 miles from the works, the last two being connected by another and larger ditch 6 miles in length, and a natural water course 5 miles long, to convey storm water from the St. Charles River. These reservoirs, however, are solely dependent upon storm water, with the exception that No. 2 received a limited amount of water from the original St. Charles ditch. This dependence was too uncertain for an industry of the present magnitude of the Minnequa Works, and a more comprehensive scheme was determined upon.

The scheme includes the utilization of a 5,674,000,000 gal. storage reservoir constructed by the Colorado Fuel & Iron Company 6 miles from Leadville, close to the snow covered mountains near the headwaters of the Arkansas River, to supplement water rights on the Arkansas River purchased to supply the works with the quantity required. The accumulated water, when needed, is to be discharged from the reservoir to the bed of the Arkansas River and permitted to flow for 130 miles to a point where it is diverted by a low dam into a conduit some 38 miles in length, which will convey the water (less the percentage determined by the State engineer) into reservoirs Nos. 1, 2 and 3. It is stated that quite tedious legal proceedings were necessary to secure the water rights, one of the preliminaries being the formal notification in person of 2570 possible objectors who might have had reason to anticipate that the diversion of water would interfere with their vested rights. The great bulk of the water will not be consumed, but after passing through the works will flow to the country below Pueblo, to be used for irrigation.

Hundreds of miles of actual survey were run in securing the data necessary. Hydrographical, topographical and geological conditions, the character of surface and surface cover, and the water allotments on different tributaries of the Arkansas River, the present demands of the Minnequa steel plant and its future possibilities, all received careful attention. The survey required and the construction work in progress were and are under the direction of R. M. Hosea, chief engineer of the Colorado Fuel & Iron Company, the field work being in direct charge of W. M. Porter, assistant chief engineer. After the various sources had been examined, different routes surveyed and general estimates prepared, the entire subject was taken up by a commission appointed by the president of the company, and composed of himself and his assistant, the general manager of the Minnequa plant and his chief engineer, the chief engineer of the company and his assistant, the then State engineer of Colorado, the assistant attorney of the company, and John Birkinbine as consulting engineer. This commission united in a report approving the above described plan under which the water supply is being constructed as being the most desirable, and specifications were prepared upon which competitive bids were obtained. The prospective demands of the Minnequa Works were fixed by the commission at 50,000,000 gal. of water daily, and the works are planned to supply this quantity.

No La Belle-Wheeling Consolidation.—We can state on the highest authority that press reports to the effect that the interests of the La Belle Iron Works, Steubenville, Ohio, and the Wheeling Steel & Iron Company, Wheeling, W. Va., are to be consolidated is untrue. It is believed the report emanated from stock brokers in the Wheeling district with the view of advancing stock prices, the stock of both being listed on the Wheeling Exchange. Several of the directors of the La Belle Iron Works are also directors in the Wheeling Steel & Iron Company, and, while such a consolidation may be favored by certain interests, nothing definite looking to a merger of the two companies has been done.

G. E. Variable Speed Motors.

A line of variable speed commutating pole motors particularly intended for driving machine tools, hoists, &c.,

Fig. 1.—The Type CQC General Electric Commutating Pole Motor.

and which will give an increased output from a given motor frame, is being placed on the market by the General Electric Company, Schenectady, N. Y. The larger sizes of this new line of motors are designated as the CLC type and the smaller sizes as type CQC. Fig. 1 shows an exterior view of one of the latter, and Fig. 2 shows an unassembled view of one of the former.

As can be seen from the illustrations, the commutating poles in these new machines are placed between the main field poles, and are so wound that they are excited by a portion of the main current. The main field is usually provided with an ordinary shunt winding, but may be also compound wound when service conditions require. The commutating poles provide a magnetic field of sufficient intensity to neutralize the effect of the current in the armature coils which are short circuited during commutation. Sparkless commutation at all loads within the speed range specified is thus obtained. As the action of these poles is reversible the motors can be run equally well in either direction. Not only does the addition of the commutating poles improve the operating conditions of the motors, but the new machines can be operated at a higher output over a wider speed range, so that greater power is concentrated in a small size frame.

The mechanical details of construction of the new line of motors are similar to those of the CL and CQ motors made by the same company. In the CLC motor the field frames are of cast iron, while in the smaller size CQC type they are of steel. Both types of motors are so constructed that, by turning the bearing brackets through 90 or 180 degrees relatively to the frame, the machines can be mounted on the wall or ceiling. Where motors are used in places where flying particles of dirt are likely to injure the machine, the bearing brackets are fitted with perforated handhole covers, which protect the motor, and at the same time allow free circulation of air through the windings. Solid handhole covers can be supplied when it is necessary to entirely inclose the motor. The capacity of motors under such circumstances, however, will be somewhat reduced owing to the decrease in ventilation.

The CQC motor, combining as it does the compactness and the general efficiency of the CQ type of motor, together with the advantages accruing from the use of the commutating pole, is particularly suitable for individual variable speed machine tool drive. It is small in diameter, comparatively short along the shaft and substantial in construction. All these qualities make it an ideal motor for driving lathes, as it can be mounted on the top, bottom or side of the driven machine. Similarly, the commutating pole type CLC motor is suitable for the larger classes of machine tool work as well as for ordinary commercial requirements. Type CQC motors range in size from 5 to 20 hp., and the CLC motors are built in capacities up to and including 130 hp.

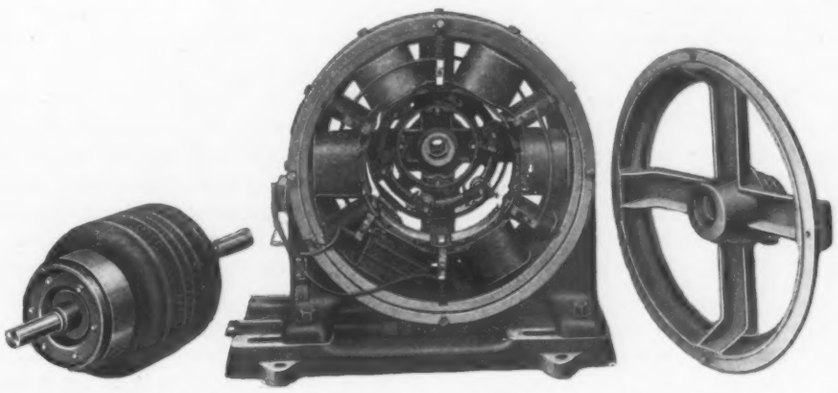


Fig. 2.—The CLC Motor with Armature and Front Cover Removed, Showing the Commutating Poles.

Soft Graphite Made Electrically.

After six years of experimental work and research, Edward G. Acheson, Niagara Falls, N. Y., announces that he has discovered a process for making unctuous or soft graphite. Up to this time the graphite made by the International Acheson Company has been known as hard graphite, and it has been applied to a field not entered by the natural graphites, such as in the manufacture of electrodes, as a battery filler and as a paint pigment. The soft graphite will be used as a lubricant, a stove polish and also for coating gunpowder, for such powder is tumbled in graphite to coat or face it. It will also be used for electrotyping.

As it can be manufactured at comparatively low cost it is expected that the new soft graphite will become a succesful competitor of natural graphite. The Niagara soft graphite will always be uniform, the product of the experimental furnaces having been very satisfactory. A furnace opened on Friday, August 24, contained 1200 lb. of fine quality. It is worthy of note that Mr. Acheson has given the world carborundum, the hardest known abrasive, and now he has discovered a very soft graphite that will compete with oils and grease as a lubricant, both wonderful products coming from electric furnaces. Mr. Acheson predicts that within a few years the manufacture of artificial graphite will be the largest industry at Niagara Falls.

The Youngstown Engineering Company, Youngstown, Ohio, in addition to its other products, has taken up the manufacture of rods, heavy bolts and light forgings. E. C. Meyers, for several years with the Wellman-Seaver-Morgan Company, has charge of this department. Mr. Meyers is the designer of two machines for making these products that have been installed in the plant.

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Much of the buying of new equipment on the part of users of machine tools is with the purpose of increasing the capacity of existing plant by replacing old machines with others of greater productiveness, and it is in connection with these purchases that the element of prices for discarded machines becomes a more or less important consideration. The machinery dealers can afford to make

substantial concessions on prices by deducting the allowance for the old machinery, knowing that they can soon turn the tools into cash. In fact they are usually hungry for many types and sizes of machine tools, their stocks being almost entirely depleted and inquiries from probable customers being frequent. When the time comes that the machine tool industry returns to its former normal condition, second-hand machinery must slump first of all, and those manufacturers who intend to improve their plants by bettering their machine equipment will doubtless be wise if they take advantage of the second-hand machinery market as it exists to-day.

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Of course where production depends wholly on the number of hours which a machine operates, night work may be as profitable as day work. Automatic machinery will produce as much by night as by day, and frequently one finds that this class of production is maintained night and day, power being bought, if necessary, for the purpose of running motors, in order that the shop engines may be idle. Coarser products, where brute strength or elementary skill is the chief element in the make-up of the workman, may be advantageously manufactured at night, though the production is seldom that of a day force. But when it comes to such labor that the skill of the operator is the chief factor of production, or at least a very important factor, then the showing of night labor is much less satisfactory. In the machine tool shop or in other works building machinery, night work has been shown to be unprofitable, though it may be necessary to resort to it at times in order to meet some particular demand upon the manufacturer's productive resources. The same thing is true of overtime work. As the head of one of the largest machine tool manufacturing concerns in the country has put it, overtime work may be employed with profit during a short period "to get the manufacturer over a hill, but when it comes to trying to maintain the business on a plateau above the plain of normal maximum production then the longer hours do not pay."

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The Mining Engineers in Germany.

German Hospitality.

A goodly number of the members of the American Institute of Mining Engineers who had been in attendance at the joint meeting with the Iron and Steel Institute in London accepted the invitation of the Verein deutscher Eisenhuettenleute to visit Duesseldorf and the works of the famous Rhenish Westphalian iron manufacturing district. The people of the Rhine country have always been famous in Europe for their genial hospitality. They have a wonderful capacity both for serious, sustained work and for gayety and good cheer, and managed during the four days which their American guests spent with them to carry them to the point of exhaustion, although they were gravely advised that the programme had been arranged with liberal periods of rest.

Although the visit was timed when the vacation period in Germany is at its hight and many of the leaders of industry were absent, yet a very considerable number of them made a sacrifice of their summer plans to welcome the American guests. At the head of the reception committee was the president, Fr. Springorum, general manager of the Hoesch Steel Works at Dortmund, one of the famous plants of the district, supported by E. Schaltenbrand, president of the council of the Stahlweks-Verband; H. Lueg, the head of the firm of Haniel & Lueg, manufacturers of machinery and the chief of a family owning very important coal and iron interests; August Thyssen, one of the most striking personalities in the German steel trade, whose firm owns among a series of works the modern plant known as Gewerkschaft Deutscher Kaiser; Moritz Boeker, the largest manufacturer of special crucible steels in the Remscheid district; Gisbert Gilhausen, a member of the board of directors of Fried. Krupp of Essen; Paul Reusch of the Gutehoffnungs Huette; Heinrich Kamp of Phœnix; Fr. Kintzle of Rothe Erde; Ottokar von Kraewel of the Rheinische Etahlwerke; C. Dahl of Deutscher Kaiser; Ernst Schiess, one of the leading makers of heavy machine tools in Germany; Max Meier, the general manager of the great Differdingen works in Luxemburg; Otto Knaudt of the Essen firm of plate and boiler makers; Fritz W. Luermann, the famous blast furnace engineer; Robert Klein of the Dahlbruch firm of builders of rolling mill machinery; Hugo Sach, a well-known inventor and engineer; and last but not least, Dr. E. Schroedter, the indefatigable secretary of the association, and his associate, Dr. W. Beumer, whose genial personality soars above his arduous duties as a member of the Reichstag and as secretary of the "Verein zur Wahrung der gemeinsamen wirtschaft, Interessen in Rhineland und Westfalen," and of the northwestern group of the "Verein deutscher Eisen-und Stahl-Industrieller." One of the honored guests, a delicate compliment to the American visitors, was the veteran metallurgist, teacher and author, Dr. Hermann Wedding of Berlin, an honorary member of both the American Institute of Mining Engineers and the Verein deutscher Eisenhuettenleute.

At Duesseldorf.

Since ten days had intervened between the close of the tour in England and Scotland and the beginning of the meeting at Duesseldorf, it was during the whole day of Monday, August 13, that the American engineers drifted into the charming German town. As a modern industrial city Duesseldorf is a splendid example of what German civic spirit is capable of achieving. Clean, orderly, with beautiful parks, splendid public institutions, exceedingly well managed public utilities, Duesseldorf holds out an ideal which many American communities, hardly younger, might well strive to attain. As an example of the business enterprise which does not neglect opportunities the fact may be noted that a private company built a splendid bridge across the Rhine at Duesseldorf at a cost of about $3,000,000, and created a suburb on the other bank, admirably laid out, substantially built, and provided with adequate transportation facilities. As a real estate enterprise, it is reported to have proven a very satisfactory venture.

The Trip Down the Rhine.

On Tuesday morning the party boarded a special Rhine steamer, and proceeded down the river, which at this part of its course is wide, with flat, low banks, carefully conserved. The traffic on the river appears to be very heavy, and on both banks are many apparently flourishing industries whose transhipment facilities seem well worked out. Conspicuous among the plants under construction is a very large works for the manufacture of zinc white and of spelter, which the well-known firm of Grillo is completing.

On the way down the river the boat passed under a very fine new bridge across the Rhine, which is being erected by the bridge department at Gustavsburg of the Augsburg & Nurnberg Company. The bridge, which connects Ruhrort and Homberg, is 2020 ft. long and has a central opening of 667 ft. between pier centers, and contains a suspended span of 443 ft., the approach spans in the extreme side openings being also suspended. The particular feature of the design is that the central suspended span has a curved top chord, so that the points where cantilever arm and suspended span meet are the shallowest points of the truss. This suspended span is hung to the cantilever arms by pendulum supports, giving free expansion.

Then the party reached Walsum, where the Gutehoffnungs Neutte has built a harbor, equipped with modern electric cranes, coal and ore conveyors to handle 2,000,000 tons annually. The docks are 833 and 767 ft. long and extend 393 ft. into the open stream.

The Krupp Works at Rheinhausen.

Returning, the gentlemen of the party landed at the harbor of the Friedrich-Albert Huette, belonging to Krupp, in which practically all the merchant work of the great concern is being gradually concentrated, leaving the Essen works for war purposes. In some respects the Essen works and their dependencies had failed to keep abreast with modern blast furnace, basic steel works and rolling mill practice for merchant shapes and track material, and accordingly a comprehensive scheme of laying down a new plant was begun in 1896 with the erection of three blast furnaces at Rheinhausen on the Rhine, the area controlled being 620 acres. Development has progressed steadily since then, and now the entire establishment is one of the largest in Germany, if not in Europe.

The entire Krupp interests are nominally in the hands of a stock company, all the shares of which are held, however, by Miss Krupp, the management resting with a board of twelve directors. At Rheinhausen a private harbor has been built, with a dock wall about 1700 ft. in length, controlled by the unloading machinery which is American in type, there being eight electrically driven on handling cranes with a capacity of about 50 tons per hour. From the stock piles the raw materials are transported by a suspended railroad and delivered to the stock charging machinery. These, in the case of the three furnaces first built, are vertical hoists, to which the stock is delivered by buggies filled from bins. In the case of the three more modern furnaces, the stock is conveyed electrically from the bins by suspended buckets to the inclined automatic skipways.

The first three furnaces, built in 1896 and 1897, are 75.4 ft. in hight and have a capacity of 14,130 cu. ft. each, producing from 200 to 250 tons of iron per day of 24 hr. In 1903 the erection was begun of three larger furnaces 85 ft. high, with 21,200 cu. ft. capacity, producing between 450 and 500 tons of iron per day. Each furnace is backed with four Cowper two-pass stoves 102 ft. and 112 ft. high. These furnaces have shells 1¼ to 1½ in. thick, are lined with only one course of fire brick, a system quite prevalent in Germany, which it has been found gives relatively better results with poorer grades of coke. The iron contents of the ores range between 30 and 55 per cent. and average 40 per cent. The blast furnace gas, which is cleaned until it carries only 0.02 grammes

of dust per cubic meter, is used for driving the blowing engines, of which there are eight in two groups of four of 1600 hp. each. They are of the Nurenberg type and deliver 35,300 cu. ft. of air per minute each. There is an ingenious signaling device from the blast furnaces to the engine rooms. As a reserve there is an equipment of four vertical compound blowing engines capable of delivering each 31,800 cu. ft. per minute at a pressure varying from 10 to 18 lb. There is also a gas engine driven electric plant with six 1000-hp. engines for power purposes, the current being delivered at 550 volts, and two 300-hp. units for lighting at 250 volts. As an auxiliary to the furnace plant there is a by-product coke oven plant with two batteries of 60 ovens.

The basic Bessemer plant consists of two 500-ton mixers, located at such a hight that the metal can be poured from the ladles into the converters, which have a capacity for blowing 20 to 23 tons, the lay-out being very neat. The steel is cast into ladles carried by electrically driven locomotive cranes to the shallow pit, where the molds take four to five tons.

The rolling mills are installed in a series of very impressive sheds and consist of a reversing 45-in. blooming mill, driven by a very heavy horizontal steam engine, which has a capacity of 1680 tons per 24 hr. A second blooming mill is being installed. The blooms are either conveyed directly to other mills in line, or laterally by overhead electric cranes to other finishing mills.

The heaviest finishing train in continuation of the blooming mill is a reversing two high 33½-in. mill driven by a 15,000-hp. steam engine. On this train rails are rolled direct to a possible length of 377 ft. On the other side of the engine is a three high 33½ in. train for shapes, &c. There are also one 27½-in. three high mill, one 20½-in. three high mill, one 16½-in. three high mill and one 11¾-in. reversing mill, each driven by a gas engine. The cooling and straightening beds and shipping facilities are very elaborate and extensive, and there is a particularly handsome yard traveling crane for the rail mill.

A considerable part of the inspection was made during a pouring rain, which made a collation served in one of the shops particularly welcome.

Entertainment.

The ladies in the meantime had been driven to the workmen's cottage colony and clubhouse, developed along the very liberal lines which Krupp has elaborated for so many years at the Essen Works.

On the return to Duesseldorf on the steamer an elaborate dinner was served, at which the cordial spirit prevailed which characterized all the gatherings.

In the evening the engineers were the guests of the mayor of Duesseldorf at a conversazione at the Tonhalle, a municipal building containing a number of handsome halls at which functions of this character both municipal and private are held. The Americans were welcomed by the chief mayor of the city, Wilhelm Marx, and enjoyed a rare musical treat, a series of old German songs being rendered by the Men's Choir of upward of 100 prominent citizens, which claims the distinction of being the leading body of its character in Germany.

On Wednesday, August 15.

Three alternative excursions were offered to the gentlemen of the party, the first being to the Rheinprussen colliery operated by the Haniel family, which owns a coal area of about 36.5 square miles on the Rhine near Homberg. The property is being developed, and when the plans now being executed are carried out will have a daily output of 1350 tons of by-product coke. It is expected that in 1909 the colliery with its five shafts will have a capacity of 3,000,000 tons of coal and 795,000 tons of coke per annum.

A second party started on an excursion to the two great works at Ruhrort, the wonderful Rhine harbor, with its tonnage of over 20,000,000 tons per annum—the Phoenix and the Rheinische Stahlwerke.

An interesting undertaking in connection with the Phoenix plant is the construction of a tunnel 2.17 miles long equipped with electric conveying machinery to connect the store plant direct with the shafts of the company's collieries. This tunnel will allow the coal to be handled at the least possible cost and at the same time will enable the company to get rid of the furnace slag, which will be carried back to the mines to be used for underground filling. The Phoenix has six blast furnaces, three of them modern, and is adding two gas blowing engines to the gas blowing engine now in operation. In 1905 the furnaces made 246,165 tons of pig iron. The basic Bessemer plant, with three converters, made 274,262 tons of steel in 1905 and rolled on two blooming mills 291,908 tons of ingots, including open hearth steel made in six furnaces producing 81,421 tons of steel. Phoenix has long been famous for its girder rails, considerable quantities of which were imported in former years into the United States. The company which also, at a series of other plants, makes wire products on a large scale, rolls all leading sections, makes tires, wheels and forgings and as a specialty produces seamless steel projectiles, bottles and seamless tubes.

The Rheinische Stahlwerke is one of the progressive German steel companies. There are four modern blast furnaces with a daily capacity of 1400 tons, with one 3000-hp. gas blowing engine, two further units approaching completion. The basic steel plant has four 15-ton converters, a 43.3-in. reversing blowing mill driven by a 6000-hp. steam engine and two finishing 33.5-in. trains each driven by 2500-hp. vertical tandem steam engines. One serves for the production of billets and bars and the other for rails and shapes. A continuous bar mill of the Morgan type is being installed.

The third excursion visited the Gutehoffnungs huette at Oberhausen, one of the oldest of the large German works, which in 1872 succeeded the firm of Jacobi, Haniel & Huyssen, established in 1808. The corporation is almost unique in Germany for the wide range and great variety of its products, which are manufactured from the raw materials in the ground owned by the company. It has a coal estate producing daily close to 100,000 tons of coal, a part for the open market, very extensive holdings of minette ore in Luxemburg and Lorraine, and furnaces, rolling mills, forges, machine shops, bridge works, boiler shops and foundries. All these have been acquired and developed from accumulated earnings, and large sums have only recently been set aside for additions and betterments. Thus the furnace plant at Oberhausen, now consisting of nine stacks, is to be brought up to date by the building of modern furnaces. It may be mentioned that at the present plant there are 17 gas engines driving electric generators, with an aggregate of 9820 hp. and four gas-driven blowing engines of 3000 hp. This furnace plant has an annual capacity of 500,000 tons.

The basic Bessemer plant is equipped with two small mixers, the first built in Germany. Some interesting results in the desulphurization of the pig in transit from the blast furnaces and in the mixers have been obtained. There are four basic Bessemer converters and seven open hearth furnaces and a series of rolling mills, some of them modern in design and construction to roll billets, rods, railroad material, shapes up to 21.65 in., wire rods, &c.

At Oberhausen there are a fine modern bar mill, sheet mills and two very handsome plate mills, rolling the largest plates in Germany outside of the armor plate cones. Connected with these is a thoroughly modern plant for pressing boiler heads, and for flanging and heavy press work generally. A special shop is devoted to the manufacture of tires and forged wheels. For heavy forgings, marine and engine shafts there is a steam hydraulic forging press of 2500 tons pressure and a series of 10 steam hammers. There is a very large iron and metal foundry, in which castings of exceptional size are made, and a store foundry in which a wide variety of products are manufactured, some of them of large dimensions. It was here that the visitors saw in practical operation the method for heating the tops of ingots by a portable heating furnace, in order to avoid the development of shrinkage cavities and unsound heads.

The Gutehoffnungs huette has for many years made

a specialty of manufacturing engines, mining and rolling mill machinery, including among its varied products Koerting gas engines, four cycle gas engines of special design, steam turbines and turbo generators, cranes, conveying machinery, Riedler pumps, &c. One of the special departments of the Gutehoffnungs huette is bridge building, with an annual capacity of 20,000 tons. Some very notable structures have come from these shops, including a steel floating dock of 11,500 tons for Hoboken, Belgium, for Danzig, Kiel and Wilhelmshafen and Tsingtau in China, giant cranes, bridges over the Rhein at Duesseldorf and other points, at Bern, Switzerland, some of the great railroad sheds in Germany, &c. Altogether the works employ 22,000 men and produce 500,000 tons of pig iron and 450,000 tons of steel per annum.

During the day the ladies of the party visited the famous art galleries of Duesseldorf and were entertained at luncheon at the "Malkasten," an artists' club.

In the evening the American engineers, their ladies and hosts sat down to an elaborate banquet at the Tonhalle, music being furnished by the full band of the Eighth Regiment of Uhlans. A series of toasts were received with great enthusiasm, the occasion being one of hearty and prolonged gayety.

Thursday proved to be another full day, being devoted to an

Excursion to Remscheid.

Leaving Duesseldorf by special train, which was provided for every occasion, the party soon arrived at Vohwinkel after having had the somewhat novel experience of having the train assisted up a heavy grade by rope traction. Vohwinkel is the one terminus of the highly interesting Langen monorail suspended railroad which provides one means of traffic for the large twin cities of Elberfeld and Barmen, the centers of great textile and other industries crowded along the narrow and tortuous valley of the Wupper River, a mountain stream subject to occasional heavy floods.

There are packed in this valley about 300,000 people, and all the ordinary channels of intercommunication have been pre-empted long ago. The proposal was broached, therefore, to lay the course of the road directly above the bed of the Wupper River. An elevated road of the ordinary type seemed out of the question because the placing of supports in the river bed involved very serious problems as to the stability of the foundations. A suspended monorail double line was finally decided upon. The iron construction which carries at both the lower outer edges a rail girder with traveling rail, is held at distances of 60 to 100 ft. on cross girders which are borne above the river by slanting lattice girders.

At distances varying from 600 to 1000 ft. these supports are shaped as anchored yokes, in order to take the longitudinal thrusts, which are produced when braking or from expansion due to increase of temperature. The other supports rest on ball and socket joints. The curves in the track are in two places as sharp as 250 ft. and at one point 100 ft., but usually are not under 300 ft. At one point there is a long grade of 1 in 25 ft.

The total length of the road is 7¼ miles. The cars are suspended from the single rail from two bogies 26 ft. apart, each running on two wheels driven by spur gearing from a 36-hp. electrical motor fixed between the two wheels and projecting outward. The cars sway a little as they round sharp curves, but the riding does not in any way convey any sense of insecurity, while the travel for miles over a tortuous river bed in the midst of a populous city is rather an interesting experience.

At the end of the line the party took cog wheel electric surface cars and proceeded through an interesting and picturesque country to the Tolleturm and thence to the city of Remscheid, famous as the center of the hardware and cutlery industries of Germany. The party did not visit any of its industries, the principal object of technical interest of the trip being the inspection of

The Electric Steel Furnace

at the works of Richard Lindenberg, where the Héroult method has been developed by the engineers of the works and of the Elektrostahl Gesellschaft. Dr. Héroult himself was a member of the party, but, as was explained, had not visited the works before. The methods were explained by Dr. Fr. R. Eichhoff, consulting metallurgist, who has just accepted a call to the Berlin University, and by Mr. Lindenberg, the manager of the works. It was frankly stated, however, that some of the details of the practice developed at the Remscheid works were withheld.

The plant consists of a 2-ton Wellman open hearth furnace, in which the raw material, principally scrap, is melted down, and the process is so conducted that the steel is over oxidized. The steel is then transferred to the Heroult electric furnace, where the operation is really that which is known in crucible steel practice as "killing" the steel. The quantity charged is about two tons, and the steel is purified in the electric furnace by the addition of scale or ore, and thus the elements in the metal, like silicon, carbon, manganese and phosphorus, are oxidized, sulphur, however, being an exception. The slag is cast off by tilting the furnace. Then a neutral slag is formed in the furnace by additions of lime and sand, under which deoxidation is carried on by means of carbon.

Manganese, tungsten or other additions to the steel may be made to it by adding to the covering slag oxides of manganese or tungstic acid, and it is a special advantage of the method that practically all of the manganese thus added is recovered in the steel. The fact that the slag is white shows that no iron or other oxides are left in it. The yield therefore is high, being on an average 92½ per cent. in the form of hammered blooms. The phosphorus contents of the steel have averaged 0.005 and of sulphur 0.012 per cent. The charge requires from 2 to 2½ hours independent of the size of the furnace.

At Remscheid experience has shown that with a 2-ton furnace the cost of the steel can be brought down to 120 marks, and it is estimated that with a 10-ton furnace it can be brought down to 90 marks per ton. With a 2-ton furnace the requirement of electric power is 360 kw. per ton of steel, and it is estimated that with a 10-ton furnace this will be reduced to 150 kw. At Govtfors, Sweden, a 5-ton electric furnace has been in successful operation for a considerable period. During the visit of the engineers a cast of steel was made which poured quietly, while the stock of hammered blooms at the works and samples of bars which were shown proved it to be of high quality.

After enjoying the hospitality of the company the party started on special electric street cars through the curious town of Remscheid to Thalsperre, a stone dam thrown across the valley of the Eschbach to impound water for the city. The German love of nature has utilized the opportunity to surround the lake so made with a charming park, and locate in it a restaurant, where an elaborate dinner was served. Music again was one of the features of the entertainment, German folk songs being rendered by the choir organized among the employees of the Bergische Stahl Industrie, the leading crucible steel plant of the district. On the way home, before reaching Solingen, occasion was offered to see the famous Kaiser Wilhelm bridge, which spans the valley, the rail being 350 ft. above the river level, and the main span being 525 ft. from center to center. It is a graceful structure.

Friday brought the last day and

The Crowning Event of the Visit

in the form of a trip on the Rhine. Starting from Dusseldorf by special train to Coblenz, the engineers spent an hour in the extensive wine cellars of the firm of Deinhard & Co. inspecting the methods of manufacture of champagne. An elaborate luncheon followed, at which some of the most famous vintages of the Rhine were tested, with the accompaniment of singing by a choir composed of employees of the firm. With the band of the iron workers of one of the large steel plants of the Saar district at the head a procession was then formed, which marched through the streets of Coblenz to the pier on the Rhine, where a special steamer was in waiting, gayly decorated with flags, to carry the party up the Rhine. Favored by splendid weather the visiting engineers and their hosts, whom a few days of acquaintance had made cordial friends, sailed up the charming river as far as

Boppard, saluted by passing crafts, and then turned to sail back to Cologne. A gay banquet while afloat ended the proceedings, one charming feature being the dancing by four of the young ladies of the German committee of an exceedingly graceful minuet.

Not content with having showered their guests with overflowing hospitality, two further additions to the programme were offered, of which many availed themselves.

On Sunday morning, at the invitation of Max Meier, a special saloon car left Dusseldorf to convey a number of guests to the beautiful city of Luxemburg, the following day to be spent in a visit to the great steel works and rolling mills at Differdingen, of which Mr. Meier is general manager, and at which the Gray mill for rolling shapes on a universal mill was first successfully introduced.

Another party, under the guidance of Dr. Weiskopf of Hanover, undertook a further even more ambitious trip. On Monday a visit to the iron ore mines and blast furnaces of the Ilsede Huette and the steel works and rolling mills at Peine was planned. In the evening there was a special session of the United Technical and Scientific societies of Hanover, at which Mr. Graessner, the general manager of the German Potash Syndicate, was to deliver an illustrated lecture on that industry in the English language. Tuesday was to be given to a visit to the Ronnenberg potash works and to various entertainments, while Wednesday was set aside for a trip to the Hartz Mountains, including a visit to the old Rammelsberg mines near Goslar and the smelting works at Oker. C. K.

PERSONAL.

A. C. Ryan, who resigned recently as superintendent of the blooming mill of the Tennessee Coal, Iron & Railroad Company, at Ensley, Ala., has been engaged by the Bethlehem Steel Company to take charge of the erection of its new structural mills at South Bethlehem, Pa., and of roll turning and designing.

Fred P. Mauss, formerly superintendent of the Indiana Rolling Mill, Newcastle, Ind., has resigned his position with that company and accepted the office of general manager of the Peterboro Steel Rolling Mill Company, Peterboro, Ontario, Canada. The Peterboro Company was recently organized with a capital stock of $200,000, and is at present erecting a mill under the direction of Mr. Mauss. The product of the new mill will be high carbon sheet steel required for agricultural shapes.

Frederick A. Shick and T. J. Arnold resigned last week as secretary and treasurer of the Passaic Steel Company, Paterson, N. J. J. B. Cooke, who was treasurer of the company under a previous administration, has been elected secretary and treasurer.

F. du P. Thomson is closing his engineering office at Buffalo, N. Y., to give his time entirely to the interests of the Wheeling Mold & Foundry Company, Wheeling, W. Va.

George Entreken has severed his connection with the Fairbanks Company, Pittsburgh, and is now with the Konold Company, 701 Keystone Building, Pittsburgh, handling materials pertaining to steam plant, water works or gas engine requirements.

B. R. Shover, for some years chief engineer of the Ohio Works of the Carnegie Steel Company at Youngstown, Ohio, has resigned to accept a similar position with the Indiana Steel Company at Gary, Ind.

William Cletsoe, formerly chief engineer at the Bessemer works of the Republic Iron & Steel Company, Youngstown, Ohio, has been appointed assistant chief engineer at the new Bessemer plant of the Youngstown Sheet & Tube Company.

Following the resignation of Charles R. Hart, as general manager of the Republic Iron & Steel Company, to become president of the Inland Steel Company, T. R. Aiken, formerly assistant to the vice-president, has been made general superintendent. T. W. Bray has been made administrative head of operating departments, covering the engineering and manufacturing departments.

Major A. E. Piorkowski, 31 Nassau street, New York, who has represented the German Steel Verband in the United States as selling agent in the past year, has resigned. His successor has not yet been appointed.

Harvey Z. Kelly, superintendent of the rail finishing department of the Bessemer plant of the Republic Iron & Steel Company, Youngstown, Ohio, has resigned to engage in other business.

Mackintosh, Hemphill & Co.'s Improvements.

Owing to the phenomenal increase in their business, especially in steel castings and steel rolls, Mackintosh, Hemphill & Co., Pittsburgh, Pa., have found it necessary to increase their facilities for handling their work, and to that end are making several additions and improvements to their works. Twelfth street, on which their already extensive works front, has been vacated by the city and will be used by the company for storage purposes. A crane runway, extending from Etna street, which at this point is occupied by the Allegheny Valley Railroad, to the Baltimore & Ohio Railroad, a distance of 365 ft., is being installed by the Pittsburgh Steel Construction Company. This runway will be surmounted with a 25-ton Morgan electric traveling crane having a 5-ton auxiliary hoist. The crane will be used for loading or unloading cars at either end, transferring material to the narrow gauge shop tracks, and handling flasks, &c. A spur track from the Allegheny Valley Railroad at Etna street will enter the erecting shop from the Twelfth street end, a large door having been cut for this purpose, which will greatly facilitate shipments of finished work.

In the steel foundry a new crane runway is being erected to carry a 40-ton ladle crane, which will be installed to take care of the output of three open hearth furnaces, one of which, a 25-ton furnace, is now being erected by the Amsler Engineering Company, Pittsburgh. This furnace is of special design, owing to the limited space in which it must be erected. It is being built between the walls of the present steel foundry and the former ingot mold foundry. After the completion of the furnace the walls will be torn out and the two buildings connected; the contents of the furnace can then be used in either building as may be desired. This arrangement practically doubles the floor space that may be used for steel castings. The furnace has a hearth 12 x 20 ft. and will be fired with natural gas. An Ingersoll-Rand air compressor with a Cutler-Hammer electric regulating device has been installed for operating foundry appliances, chipping hammers, &c. Among other improvements contemplated may be mentioned a pattern storage building, 75 x 200 ft., four stories high, equipped with large elevators for handling patterns. The construction of the improvements is in charge of D. F. Nisbet, engineer, 619 Lewis Building, Pittsburgh, Pa.

Milliken Brothers' New Steel Plant.

The work of constructing the new open hearth steel plant and rolling mill of Milliken Brothers, Incorporated, located on Staten Island, N. Y., is now nearing completion, and the works will start up during the month of October. This company is now taking orders for the supply of billets and slabs, and the capacity of the plant will undoubtedly relieve to a considerable extent the difficulty that Eastern manufacturers have had in obtaining this class of material. The company will be prepared to turn out structural material, consisting of beams, channel, angles and zees about one month after the works have been making billets and slabs. The plant is equipped with the most improved machinery of every kind, it being one of the few in the United States that has been built new from the ground up without reference to any old or existing plants. Its capacity is about 12,500 tons per month. The main office is at 11 Broadway, New York City.

OBITUARY.

JAY C. MORSE.

Jay C. Morse, for many years a prominent figure in the Western iron trade, died at Cleveland, Ohio, August 22, aged 68 years. He was born at Painesville, Ohio, his father being a cattle dealer and a substantial land owner. Educated in the local public schools, he became a clerk in a Painesville hardware store, but soon afterward removed to Cleveland when 20 years of age to take a clerkship in the freight department of the Lake Shore & Michigan Southern Railroad. The Cleveland Iron Mining Company then sent him as its agent and representative to its mines in the Marquette ore district, where he remained until 1882, returning to Cleveland as vice-president of the company, which position, however, he retained only a short time, retiring to unite with Samuel Mather

JAY C. MORSE.

and the late Col. James Pickands in organizing the firm of Pickands, Mather & Co.

About 1885 Mr. Morse became president of the Union Steel Company of Chicago. In 1889 this company was consolidated with the North Chicago Rolling Mill Company and the Joliet Steel Company, which resulted in the formation of the Illinois Steel Company, of which Mr. Morse was originally a member of the Executive Committee, but was elected president on the retirement of A. J. Forbes-Leith. During the association of Mr. Morse with the Illinois Steel Company, he was president of the Minnesota Iron Company and the Minnesota Steamship Company, helping materially to organize and develop both. He remained with all these companies in an active official capacity until 1896, when ill health forced him to retire from active work, but he continued as chairman of the Board of Directors of all until several years later, when the condition of his health made it necessary for him to drop all business connections, including his membership in the firm of Pickands, Mather & Co. He purchased a home in Thomasville, Ga., where he resided much of the time, but about a year ago he returned to Cleveland. He was a member of the Union, Roadside and Country clubs of Cleveland and the Chicago Club of Chicago. Mr. Morse was married twice, his second wife being the widow of Colonel Pickands and a sister of the late Senator M. A. Hanna. He leaves a widow and a married daughter.

JAMES DREDGE, who was long associated with Wm. H. Maw in the editorship of *Engineering*, died at London, England, August 15. Mr. Dredge was Royal Commissioner to the Centennial Exposition at Philadelphia in 1876, and to the Columbian Exposition at Chicago in 1893. He was author of a number of works, including "Electrical Illumination," "Thames' Bridges" and "Transportation Exhibits at the World's Columbian Exposition."

E. THOMAS HANNAM, general sales manager of the Atlas Engine Works, Indianapolis, Ind., died suddenly in Chicago of heart failure, August 18, aged 45 years. He resided in Philadelphia, and was a member of the Manufacturers' Club, the Engineers' Club of this city and of the American Society of Mechanical Engineers. He leaves a widow, two sons and two daughters.

W. G. PRICE, treasurer of the American Pipe & Foundry Company, Pittsburgh, died August 17, aged 54 years. He was born in Pittsburgh, his father having been the late William Price, a prominent Pittsburgh foundryman.

HENRY A. HITNER, the senior member of the firm of Henry A. Hitner's Sons, Philadelphia, died suddenly August 25 at the Episcopal Hospital in that city. He had been engaged in the iron and metal business for over 30 years, and at the death of his father, Henry A. Hitner, Sr., about six years ago, took the active management. He was 50 years of age and leaves a wife and five children.

SAMUEL TRETHEWEY, head of the firm of Samuel Trethewey & Co., Pittsburgh, died last week, aged 75 years. He had been in the iron and steel business in Pittsburgh since 1863, when he established the firm that bears his name and which manufactures shear knives. He was born in Chesterfield, England.

The Republic Iron & Steel Company's Pig Iron Tonnage.

Within a short time the Republic Iron & Steel Company will be a much heavier producer of pig iron in the Mahoning and Shenango valleys than it is at present. The company now has four blast furnaces in the two valleys, these being No. 1 at Haselton, Hannah at Youngstown, Hall at Sharon and Atlantic at New Castle. Of these four furnaces all are in blast except Hannah, which is being relined and repaired, and will be ready for operation within a short time. The company is building two new blast furnaces at Haselton to be known as Nos. 2 and 3. No. 2 is almost ready, and will blow in not later than September 15, while No. 3 will blow in between December 1 and 15. This will give the company a total of six blast furnaces in the two valleys, all of which will be in operation by January 1.

The present Haselton stack makes about 300 tons a day, the two new Haselton stacks are expected to make 800 tons a day, while the other three stacks will make 700 tons a day, so that by January 1 the Republic Company will have a daily capacity of 1800 tons or more of pig iron. This is more iron than it uses in its Bessemer plant at Youngstown, and it expects to have pig iron to sell in the open market at the first of the year. This would indicate that recent reports that the company was short of metal are untrue, it being fully supplied with pig iron for a sufficient period ahead or until its present furnaces are ready to operate.

The Bessemer plant is making some good records for output, its products consisting of billets from 1½ to 4 in. and sheet and tin bars. The company uses all its 4 x 4-in. billets at Youngstown, but sells the smaller billets and sheet and tin bars in the open market, and has its entire output of steel pretty well sold up to April 1. It is adding a pig casting machine at its Thomas furnaces at Thomas, Ala., and in a short time this plant will be ready to make basic iron.

Commissioner John W. Yerkes of the Bureau of Internal Revenue, who has just returned from Europe, states that England uses scarcely more than 2,000,000 gal. of alcohol annually for all purposes, and these do not subserve any important industrial end. As a source of power production for automobiles, motor boats, domestic purposes, etc., it is bound to be a disappointment, but inventive genius may succeed in proving its mechanical application to power production. Until this is done it will be no serious competitor with gasoline.

A waterproof glue may be made from three parts of gum shellac and one part of India rubber, these being dissolved separately in ether under the influence of heat, and the two solutions mixed and kept for a time in a sealed bottle. Water, either hot or cold, and most acids and alkalies will have no effect on the glue.

NEWS OF THE WORKS.

Iron and Steel.

The Detroit Furnace Company's blast furnace on the water front at Detroit, Mich., the remodeled Wayne Furnace, was put in blast on August 22. The old furnace used charcoal as fuel; the new stack will use coke, and an output of 100 tons of pig iron per diem is expected. J. C. Clutts, Wellston, Ohio, for years at the head of the Wellston Iron & Steel Company, from which he retired some time ago, is president of the Detroit Furnace Company; J. K. Pollock, of Rogers, Brown & Co., Cincinnati, vice-president, and Charles F. Frazer of Berry Brothers, Detroit, treasurer. Berry Brothers were closely connected with the old Wayne Furnace. Rogers, Brown & Co. will handle the product of the furnace, and Henry B. B. Yergason of the Cincinnati office of that firm has been active in the work of organizing the new enterprise. The establishment of an additional coke furnace at Detroit is evidence of increasing demand in that territory, which has gone quite beyond the output of the furnaces built to supply this trade, particularly the furnace of the Detroit Iron & Steel Company on Zug Island and that of the Toledo Furnace Company at Toledo, Ohio.

The blast furnace of the Youngstown Steel Company at Youngstown, Ohio, which is now idle undergoing repairs, is expected to be ready for blast about September 1.

The blast furnace of the Stewart Iron Company, Limited, at Sharon, Pa., has been running on low phosphorus iron during the greater part of this month.

Three hot mills in the Struthers works of the American Sheet & Tin Plate Company, Struthers, Ohio, were started up on Monday, August 27, and it is expected the entire plant, which contains six hot mills, will be in operation within a week. The plant has been closed down for more than a year, during which time it has been extensively repaired and considerable new equipment added.

General Machinery.

The Lovejoy Tool Works, Chicago, has been incorporated with a capital stock of $35,000, and will continue the business heretofore conducted for some years under the name of Thomas H. Lovejoy. Mr. Lovejoy is one of the incorporators of the new styled company, and with him are Wm. H. Dangel and M. E. Brennan. The line of manufacture consists of boiler makers' and railroad supplies.

The Byron Jackson Machine Works, Oakland, Cal., which formerly had its plant at San Francisco and since the fire has housed its machine shops in a hastily constructed warehouse, intends to erect a steel building, 110 x 250 ft., at West Berkeley, contract for the construction of which has just been let. In addition to this building a two-story pattern shop will be erected. The plant is now working night and day, and as soon as the machinery already ordered arrives the capacity will be considerably increased.

The Colburn Machine Tool Company, Franklin, Pa., builder of high grade vertical boring and turning mills, reports that it is extremely busy on business for both domestic and foreign trade, and that deliveries are getting farther in the future. On some sizes February is the best delivery the company can make, which is reasonable compared with the deliveries that can be made by some machine tool companies. On some few sizes deliveries can be made within the next 30 or 60 days. The company expects that within the next few weeks many propositions on which it has been figuring will be closed and its stock for reasonable delivery taken, which will throw future deliveries several months ahead.

The Fox Machine Company, Grand Rapids, Mich., builder of machine tools, received among recent orders one from the Western Electric Company for 10 No. 3½ combined hand and power feed milling machines. The company recently installed in its plant considerable new machine tool equipment, but in spite of every effort orders are coming in faster than they can be taken care of, and delivery on current orders is getting further and further away.

Power Plant Equipment.

The Portland Electric Company, Portland, Maine, has purchased the water power on the Saco River known as the Hargraves power at West Buxton, Maine, and will develop it under the direction of J. G. White & Co., New York. Electricity will be developed for transmission to Portland, where it will be used for lighting and power purposes.

The Philadelphia, Baltimore & Washington Railroad has awarded the contract for the erection of a two-story stone power station and engine house, 60 x 175 feet, at Ruthby, Del.

The Department of Water and Sewers, Asbury Park, N. J., will receive bids until September 10 for a 200-hp. internal fired boiler.

John H. Ham, agent of the Southern Express Company, Birmingham, Ala., is in the market for a hoisting engine.

A large addition is being built to the Nagle Boiler Works, Erie, Pa., which will about double the capacity.

The De La Vergne Machine Company, New York, reports the following among recent orders for Hornsby-Akroyd oil engines: Central New England Railway Company, Hartford, Conn., 7 hp., geared to pump; F. J. Stokes Machine Company, Philadelphia, Pa., 25 hp.; Hastings Pavement Company, New York, 16 hp.; W. F. Norman Sheet Metal Mfg. Company, Nevada, Mo., 50 hp.; Union Ballast Company, New York, one 20 hp. and one 32 hp.; D. P. Forst & Co., Trenton, N. J., 13 hp.; Webb Wire Works, New Brunswick, N. J., 32 hp.; J. W. Lippincott, S. P. Scott and Max Meyer, Little Rock, Ark., 50 hp. engine to drive a De La Vergne ice machine.

Foundries.

Williams, White & Co., Moline, Ill., manufacturers of machinery and coal chutes, have awarded the contract to the Tri-City Construction Company for a reinforced steel concrete building to be used as an addition to the foundry. It will be utilized for cleaning and storing castings.

The Northern Malleable Iron Company, St. Paul, Minn., has purchased about 8 acres of ground upon which it will erect an extensive foundry plant which will be equipped with modern machinery and will cost about $100,000. The company at present occupies a part of the plant owned and operated by the International Flax Twine Company, and the erection of a new plant was determined upon that both companies might have larger quarters to take care of their increased business. The new plant will be ready for operation by December 1.

The Utica Pipe Foundry Company, Utica, N. Y., is completing its new building and expects to have it in operation within the next six or eight weeks.

The Globe Foundry Company, Johnstown, Pa., recently incorporated, has purchased the foundry and business formerly conducted by W. F. Rosensteel, and will carry on a general foundry business with car castings as its specialty. The company intends to enlarge and improve the plant and to extend the present business considerably.

Bridges and Buildings.

The Leavenworth Bridge Company, Leavenworth, Kan., has been awarded a contract for two bridges over the Kaw River, one at Willard and the other at Silver Lake, Kan. The first bridge will cost $18,191, while the second will cost $16,137, both being of steel construction.

Fires.

The Baxter Molding Company's plant at East St. Louis, Ill., was destroyed by fire August 18. The loss is placed at $100,000.

The foundry and machine shop of the Dakota Machinery Company, Devil's Lake, N. D., were damaged $10,000 by fire August 20.

The foundry of the Boundary Iron Works, Grand Forks, B. C., was damaged $30,000 by fire last week.

The cement and whiting plant of the Clifford Miller Company, Brooklyn, N. Y., was destroyed by fire August 23, the loss being estimated at $40,000.

The large factory at Hamilton avenue and Bush street, Brooklyn, N. Y., occupied by the American Cork Specialty Company, Diamond Cork Company and L. Mundet & Sons, was destroyed by fire August 27, the loss amounting to $100,000. There was a large quantity of valuable machinery in the building

Hardware.

Geo. W. Brown, for a number of years connected with the Southern Plow Company, Columbus, Ga., announces the organization of the Atlanta Plow Works, Atlanta, Ga. This company will manufacture a full line of Southern steel shapes, single and double plow stocks, Boy Dixie plows, extras and repairs. A railroad site has been purchased and a contract has been let for a building to be ready for the reception of machinery within six weeks. Machinery of the most modern and improved pattern has been ordered for delivery and installation with the completion of the building, and specification for raw material and shipment thereof has been arranged with a view of the company's execution of orders from the trade about October 15. The officers of the new company are J. B. Hightower, president; Geo. W. Brown, vice-president and general manager, and S. J. Bradley, secretary and treasurer.

The Salem Sash Weight Foundry Company, Salem, Mass., has lately been incorporated. The officers are Horace N. Smith, president, and Alonzo H. Smith, treasurer, Addison H. Hodges completing the Board of Directors.

The Ross-Meehan Foundry Company, Chattanooga, Tenn., has the enlargement of its malleable plant well under way, and it is hoped to have the addition ready for occupancy by December 1.

Miscellaneous.

The Lavigne Mfg. Company, Detroit, Mich., is erecting a two-story factory, 50 x 125 ft., at the intersection of Commonwealth avenue and the Grand Trunk Railway; also a foundry building, 50 x 75 ft. The company manufactures mechanical oil pumps, carbureters, automobile specialties, and a general line of brass goods.

The Crosby Company, Buffalo, N. Y., is adding a wing 30 x 80 ft., two stories high, to increase its pressroom facilities in sheet metal stamping. The erection of an additional building is contemplated later on.

The Iron and Metal Trades

Present scarcity dominates the Pig Iron market, and the possibilities of production in the farther future get scant notice. Consumers of Foundry Iron in particular, who find difficulty in meeting early wants, are pre-empting furnace output in the early months of 1907. Only a good beginning has been made in buying for next year, and naturally the large foundry interests lead the movement. At advancing prices further business has been placed. Sellers seem less eager than buyers to reverse the practice of many months of making short intervals between sales and final deliveries.

In the Central West there is less excitement than in former weeks, while in the East, as shown in the Philadelphia market, the feeling of uneasiness on the part of buyers is more marked. That consumers are not unanimous in their judgment of the future is illustrated in the withdrawal of an inquiry for 10,000 tons of foundry iron by a Wisconsin implement works.

Pig Iron prices have advanced 50c. to $1 a ton and variations in selling prices grow more noticeable. On Southern iron prices for 1907 delivery range from $15 to $16, Birmingham, for No. 2 iron, the discrepancy coming in part from the practice of making delivered prices which meet district competition. The largest sales of the week, chiefly Northern Irons, were 16,000 tons to the Westinghouse interests and 20,000 tons to the New York Air Brake Company.

In Steel making Pig Iron, since large buyers are chiefly concerned and they are willing to let a shortage be a shortage, the market has calmed down. With the starting of the new Bessemer Steel plant at Youngstown the situation is simply that a certain tonnage of Bessemer Iron will be converted there that under other conditions would have gone to increase the Steel supply of the larger companies. Pittsburgh reports sales of Basic Iron for the first half of 1907 at $18 at Valley furnace, including 25,000 tons for Buffalo. Bessemer Iron has gone to $18.50 at furnace.

As indicating what may be expected later in the year, it is noted that three additional furnaces of the Illinois Steel Company, together producing 1000 tons a day, will be active in the next 30 days. As humidity declines Pig Iron production in all districts will increase.

The complaint always attending an advancing market is heard here and there—that Iron bought at low prices does not come forward at scheduled deliveries.

Though the United States Steel Corporation is prorating deliveries of semifinished Steel between its subsidiary Sheet and Tin Plate companies and the independent mills in those lines, the latter are considerably short of their needed supply of Steel. It is not true, however, that the Carnegie Steel Company has advanced the price of Sheet Bars to $30. September deliveries will be made at $29, as heretofore. Other Sheet Bar mills have sold at $30 and higher.

Buying of Steel Cars has begun in earnest, 15,000 being placed last week. Large orders are yet to be given out.

Heavy business in both Sheets and Tin Plates is reported in the past week and advances in both lines appear imminent. Some independent producers have already put up their prices $1 a ton.

The Bar trade shows signs of overselling. The premiums already secured by certain producers of Steel Bars may lead to a general advance. Some mills are fully sold for the balance of the year.

The basis for Lake Superior Ores for 1907 is still a subject of diverse views, a 50c. advance being favored, while some sellers would stop at 25c. in the interest of Eastern buyers. The Hill Ore deal now finds litigation over Minnesota State leases its only obstacle.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Aug.29, 1906.	Aug.22, 1906.	Aug.1, 1906.	Aug.30, 1905.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	**$19.75**	$19.25	$18.50	$16.25
Foundry No. 2, Southern, Cincinnati	**18.00**	17.50	16.50	14.50
Foundry No. 2, Local, Chicago	**19.50**	19.50	18.75	16.25
Bessemer, Pittsburgh	**19.35**	19.10	18.85	15.35
Gray Forge, Pittsburgh	**18.35**	17.85	17.35	14.35
Lake Superior Charcoal, Chicago	**19.50**	19.50	19.25	16.50
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	**28.00**	28.00	27.50	24.00
Forging Billets, Pittsburgh	**34.00**	33.00	33.00	27.00
Open Hearth Billets, Phila.	**29.50**	29.00	29.00	27.00
Wire Rods, Pittsburgh	34.00	34.00	34.00	31.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
O. Steel Rails, Chicago	**16.00**	15.00	14.00	14.50
O. Steel Rails, Philadelphia	**17.50**	17.00	16.75	16.00
O. Iron Rails, Chicago	**23.00**	22.00	21.25	20.00
O. Iron Rails, Philadelphia	**21.50**	21.50	21.00	20.50
O. Car Wheels, Chicago	**19.50**	18.50	18.00	15.50
O. Car Wheels, Philadelphia	**17.00**	17.00	16.50	15.50
Heavy Steel Scrap, Pittsburgh	**17.00**	16.50	16.50	15.50
Heavy Steel Scrap, Chicago	**16.00**	14.50	13.00	13.75
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	**1.73½**	1.73½	1.63½	1.63½
Common Iron Bars, Chicago	**1.71½**	1.66½	1.66½	1.60
Common Iron Bars, Pittsburgh	1.50	1.50	1.50	1.60
Steel Bars, Tidewater, New York	1.64½	1.64½	1.64½	1.64½
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.50
Tank Plates, Tidewater, New York	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.89½
Beams, Pittsburgh	1.70	1.70	1.70	1.75
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.89½
Angles, Pittsburgh	1.70	1.70	1.70	1.75
Skelp, Grooved Steel, Pittsburgh	1.57½	1.57½	1.57½	1.50
Skelp, Sheared Steel, Pittsburgh	1.60	1.60	1.60	1.55
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	**2.40**	2.40	2.40	2.20
Wire Nails, Pittsburgh	**1.85**	1.85	1.80	1.80
Cut Nails, Pittsburgh	1.75	1.75	1.75	1.60
Barb Wire, Galv., Pittsburgh	2.30	2.30	2.30	2.25
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	**18.75**	18.75	18.50	17.00
Spelter, St. Louis	*5.90*	5.90	5.95	5.55
Lead, New York	**5.85**	5.75	5.77½	4.80
Lead, St. Louis	**5.75**	5.67½	5.65	4.77½
Tin, New York	**40.25**	41.37½	37.40	33.00
Antimony, Hallett, New York	**24.00**	24.00	23.50	14.50
Nickel, New York	45.00	45.00	45.00	40.00
Tin Plate, Domestic, Bessemer, 100 lb., New York	$3.94	$3.94	$3.94	$3.74

Chicago.

FISHER BUILDING, August 29, 1906.—(*By Telegraph.*)

Heavy specifications for all classes of finished products which show a daily excess over production of from 50 to 60 per cent. have resulted in an accumulation of tonnage on mill order books that is without precedent in the Steel trade. The situation is considered still more phenomenal on account of the summer season, and unless consumers are largely anticipating shipment it is the forerunner of unparalleled congestion at the mills during the fall and winter months. Deliveries are already being prorated, and the product is being widely distributed to satisfy the pressing needs of the greatest number. The Illinois Steel Company now has specifications at its mills practically covering the output of three months, and the accretions over production aggregate 30,000 tons weekly. The Pig Iron situation likewise offers little encouragement to the consumer, one large Southern interest having notified its customers this week that deliveries of Iron for shipment this year, purchased on a basis several dollars a ton lower than now prevailing, will have to be extended through February, as its furnaces have been heavily oversold. Nor are deliveries from other Southern stocks sufficient to meet the requirements of local foundries, and the market for spot Iron showed still further expansion during the week, and car lots of No. 2 were sold as high as $16, Birmingham. The purchase of 12,000 tons of Northern and Southern grades for first quarter delivery by the Massillon Iron & Steel Company is the only noteworthy transaction of the week. One Wisconsin implement maker, who asked quotations on 10,000 tons of Foundry Iron for first half delivery, has withdrawn his inquiry, and will await further developments before buying. The

Republic Iron & Steel Company has withdrawn from the Steel Bar market through the remainder of the year, while the three largest makers are practically sold up to next July. An early advance is predicted, although powerful influence will be brought to bear against such action. Higher prices on Sheets following the advance of Sheet Bars are anticipated, and similar action on Wire products is expected by the trade. Spikes will be advanced $2 by the Illinois Steel Company September 1, and Light Rails have been marked up $1 a ton. Contracts for the Wrought Pipe, amounting to 4000 tons for the new Steel plant at Gary, will be awarded next week, and the Cast Iron Pipe for water distribution in the town of Gary, aggregating 10,000 tons, will soon come up for consideration.

Pig Iron.—The demand for Spot Iron for quick shipment from furnaces has been the most prominent feature of the Iron market and sales of Southern grades are being freely made on the basis of $16 for No. 2. The Republic-Tennessee interests are out of the market entirely for the remainder of the year and have fixed a minimum of $16, Birmingham, for No. 2, for next year's delivery. Stocks in the South are reported to aggregate not more than 60,000 tons, a large portion of which consists of off grades, and the scarcity of labor is hampering the loading of cars, resulting in a consequent delay of deliveries. Consumers generally are displaying less anxiety to cover their future requirements on account of the high prices that are being asked, an inquiry for 10,000 tons having been withdrawn, owing to the high prices that were quoted. Local furnaces are nearly sold up through the remainder of the year and on the small tonnage available for immediate shipment are asking $20, Chicago. In the South a movement is on for the consolidation of some of the smaller furnace interests. We quote as follows, f.o.b. Chicago:

Lake Superior Charcoal	$19.50 to $20.00
Northern Coke Foundry, No. 1	20.25 to 20.50
Northern Coke Foundry, No. 2	19.50 to 19.75
Northern Coke Foundry, No. 3	19.00 to 19.50
Northern Scotch, No. 1	20.00 to 20.50
Ohio Strong Softeners, No. 1	19.80 to 20.05
Ohio Strong Softeners, No. 2	19.30 to 19.55
Southern Coke, No. 1	19.40 to 19.90
Southern Coke, No. 2	18.90 to 19.40
Southern Coke, No. 3	18.40 to 18.90
Southern Coke, No. 4	17.90 to 18.40
Southern Coke, No. 1 Soft	19.40 to 19.90
Southern Coke, No. 2 Soft	18.90 to 19.40
Southern Gray Forge	16.40 to 16.90
Southern Mottled	16.40 to 16.90
Malleable Bessemer	19.50 to 20.00
Standard Bessemer	20.55 to 20.80
Jackson Co. and Kentucky Silvery, 6 %	22.30 to 22.80
Jackson Co. and Kentucky Silvery, 8 %	23.30 to 23.80
Jackson Co. and Kentucky Silvery, 10 %	24.30 to 24.80

Metals.—Orders for Copper for November and December delivery are now being placed by large consumers, and higher prices are expected as soon as the buying movement becomes more general. Tin is temporarily lower. We quote: Casting Copper, 18¾c. to 18⅞c.; Lake, 18⅞c. to 19¼c., in car lots; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 42½c.; small lots, 43¼c. to 43¾c.; Spelter, prompt delivery, 6.20c. to 6.30c., for car lots; Lead, Desilverized, 5.90c. to 6c., for 50-ton lots; Corroding, 6.57½c. to 6.67½c., for 50-ton lots; on car lots, 2¼c. per 100 lb. higher; Cookson's Antimony, 28c., and other grades, 26c. to 27c.; Sheet Zinc is $7.75 list, f.o.b. Laselle, in car lots of 60-lb. casks. On Old Metals we quote: Copper Wire, 16¼c.; Heavy Copper, 16c.; Copper Bottoms, 15¼c.; Copper Clips, 15c.; Red Brass, 15½c.; Red Brass Borings, 13c.; Yellow Brass, 12¼c.; Yellow Brass Borings, 10¼c.; Light Brass, 8¾c.; Lead Pipe, 5½c.; Tea Lead, 5c.; Zinc, 5c.; Pewter, No. 1, 25c.; Tin Foil, 32c.; Block Tin Pipe, 27½c.

Rods and Billets.—Sales of Rods continue to be made by the American Steel & Wire Company, notwithstanding the shortage of Steel prevailing at all its finishing mills. All of the Western mills have withdrawn from the market on Forging Billets and are now quoting only on shipments through the first half of next year. Basic and Bessemer Wire and Chain Rods are quoted at $36 to $37, Chicago, and Forging Billets, $37 to $38.

Rails and Track Supplies.—Following the advance of $1 a ton on Light Rails made by the Carnegie Steel Company last week, the Illinois Steel Company this week marked up quotations a like amount. Spikes for shipment next year will be advanced $2 on Saturday, September 1, and Track Bolts for prompt delivery in small lots are selling on a basis of 3c. The buying of Track Supplies continues of large volume, and there is a shortage of material for immediate and fall consumption. While contracts for several large lots of Standard Section Rails are under negotiation, no orders of note have been closed during the week. Quotations are revised as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50c.; carload lots, 1.75c.; Spikes, 2.27½c. to 2.50c., according to delivery; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 15c. to 20c. above mill prices. Light Rails, 30 to 45 lb. sections, $29 to $30; 25-lb., $31; 20-lb., $32; 16-lb., $33; 12-lb., $34, f.o.b. mill. Standard Sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—Specifications for the Steel for three large railroad bridges have been received by local fitters, and the contract for two bridges for a Western road, aggregating 5200 tons, will be placed this week. Additions to the power station of the Commonwealth Electric Company will require 1500 tons, and several local building projects will be closed shortly. Material cut to length in small lots is quoted at 2.25c., and heavy shipments are made to points throughout the West. Mill deliveries are deferred on account of the heavy specifications that are being received daily, and the advance building season has not lessened the demand for material. Quotations are unchanged, as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.96½c.; Beams, larger than 15 in., 1.96½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—Specifications for car shop requirements show a marked increase, and deliveries of both Sheared and Universal Plates cannot be made by the mills in less than 60 days. New tonnage is, however, comparatively light, the largest consumers having contracted for their future requirements some time ago. Quotations are firmly maintained, as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 in., 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 in., 1.86½c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in. up to 60 in. wide, 2.10c. to 2.20c.; 72 in. wide, 2.35c. to 2.45c.; No. 8, up to 60 in. wide, 2.15c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—Following the advance on Sheet Bars, higher prices on both Black and Galvanized Sheets are looked for within the near future. Independent mills are not quoting generally on the prevailing basis and a concession of $1 a ton heretofore allowed large buyers has already been withdrawn. None of the mills is in a position to make deliveries in less than 60 days, while the American Sheet & Tin Plate Company is out of the market on last quarter requirements. Quotations are firm, as follows: Blue Annealed, No. 10, 1.91½c.; No. 12, 1.96½c.; No. 14, 2.01½c.; No. 16, 2.11½c.; Box Annealed, Nos. 17 to 21, 2.41½c.; Nos. 22 to 24, 2.46½c.; Nos. 25 and 26, 2.51½c.; No. 27, 2.56½c.; No. 28, 2.66½c.; No. 29, 2.81½c.; No. 30, 2.91½c. Galvanized Sheets, Nos. 10 to 14, 2.61½c.; Nos. 15 and 16, 2.81½c.; Nos. 17 to 21, 2.96½c.; Nos. 22 to 24, 3.11½c.; Nos. 25 and 26, 3.31½c.; No. 27, 3.51½c.; No. 28, 3.71½c.; No. 30, 4.21½c. Sheets from store: Blue Annealed, No. 12, 2.15c. to 2.25c.; No. 14, 2.20c. to 2.30c.; No. 16, 2.30c. to 2.40c.; Box Annealed, Nos. 18 to 20, 2.60c. to 2.70c.; Nos. 22 to 24, 2.65c. to 2.75c.; No. 26, 2.70c. to 2.80c.; No. 28, 2.85c. to 2.95c.; No. 30, 3.25c. to 3.35c. Galvanized from store: Nos. 10 to 20, 3.10c. to 3.20c.; Nos. 22 to 24, 3.35c. to 3.45c.; No. 26, 3.45c. to 3.55c.; No. 27, 3.55c. to 3.75c.; No. 28, 3.85c. to 3.95c.; No. 30, 4.45c. to 4.55c.

Bars.—With the accumulation of specifications for Steel Bars, especially from the independent trade, deliveries continue to be further deferred, and considerable tonnage to meet prompt needs is already being directed to the Iron mills. There are persistent rumors of an early advance of $2 a ton, but none will be made providing the leading interests can curtail the action of the Steel Bar Association. No meeting has yet been called, although it is probable that one will be scheduled shortly. The Republic Iron & Steel Company has withdrawn from the market on deliveries running through the remainder of the year, and all orders for the first half of next year must be submitted to Pittsburgh before quotations can be made. The Iron mills report a continued heavy demand and quotations are firmly maintained. We quote as follows: Iron Bars, 1.71½c. to 1.76½c.; Steel Bars, 1.66½c., both half extras; Hoops, 2.06½c., extras as per Hoop card; Bands, 1.66½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras. Store prices are as follows: Bar Iron, 2.10c.; Steel Bars, 1.85c., and as high as 2c. is asked on certain scarce sizes; Steel Bands, 1.85c. to 1.90c., half extras; Soft Steel Hoops, 2.30c. to 2.40c., full extras.

Merchant Pipe.—With the advent of the fall season a heavy increase in the demand for Merchant Pipe is reported, and large distributers are buying more freely for their future requirements than they did a month ago. Prices, however, continue low, and sales are made on the basis of 81 and 5 off the list, Pittsburgh, and discounts in car lots, Chicago, are as follows: Black Steel Pipe, 79.35 per cent. on the base sizes, ¾ to 6 in., and Galvanized, 69.35 per cent. Iron Pipe is quoted from 1½ to 2 points higher. From store in small lots Chicago jobbers are quoting 76½ to 77 per cent. on Black Steel Pipe, ¾ to 6 in.

Boiler Tubes.—While new tonnage is light, consumers who contracted some time ago are specifying freely, and all

concessions have been withdrawn. Mill quotations are well maintained, as follows, on base sizes, 2¾ to 5 in., in car lots; Steel Tubes, 68.35; Iron, 55.35; Seamless, 50.35; 2½ in. and smaller and lengths over 18 ft., and 2½-in. and lengths over 22 ft., 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1⅛ in.	40	35	42½
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	30
2¾ to 5 in.	60	47½	42½
6 in. and larger	50	35	..

Cast Iron Pipe.—Concurrent demand from railroads and municipalities is heavy, notwithstanding the season, although no large contracts are now being figured on. On the smaller sizes of Pipe, ranging from 4 to 8 in., deliveries cannot be made before November 15, and on the larger sizes November 1 is the best that can be done. Quotations are unchanged, as follows: Water Pipe, 4-in., $33; 6, 8, 10 and 12 in., $32; over 12-in., $31, with $1 extra for Gas Pipe.

Merchant Steel.—Implement makers are specifying heavily on contracts closed earlier in the year, and as the orders that are being received by the mills are in excess of their production, shipments are being further deferred. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.86½c.; Iron Finish, up to 1½ x ½ in., 1.81½c.; Iron Finish, 1½ x ½ in. and larger, 1.66½c., base; Channels for solid rubber Tires, ¾ to 1 in., 2.16½c., and 1⅛-in. and larger, 2.06½c.; Smooth Finished Machinery Steel, 1.91½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.96½c.; Cutter Shoe, 2.35c.; Toe Calk Steel, 2.21½c.; Railway Spring, 1.86½c.; Crucible Tool Steel, 6½c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, in base territory.

Coke.—Slightly higher prices are prevailing for high grade Foundry Coke, 72-hour Connellsville grades having been sold on the basis of $3.25, ovens, during the week. Western foundries continue to contract freely for their future requirements, and are covering their wants to July 1 next year. We quote By-Product Foundry Coke at $5.65 to $5.75; Virginia, $5.25 to $5.40, and Connellsville, $5.65 to $5.90, according to the grade.

Old Material.—Sharp advances, ranging from 50c. to $1.50 a ton, were recorded during the week in spite of the heavy railroad offerings, and still higher prices are anticipated, as the dealers are apparently in absolute control of the situation. The Illinois Central Railroad, which disposed of a large lot of desirable Wrought Scrap, secured as high as $17.50 for No. 1, while Heavy Melting Steel sold at $16. Lots of miscellaneous material, aggregating 8000 tons, were disposed of by the Chicago, St. Paul, Minneapolis & Omaha, Rock Island, Chicago, Burlington & Quincy and the Illinois Central railroads, and, without exception, higher prices were paid by the dealers than those that were ruling the previous week. The Pullman Company purchased 3000 tons of Wrought Scrap, while the Inland Steel Company is in the market for 5000 tons of heavy melting Steel. Several Indiana Iron mills are likewise buying, and dealers are still covering short sales made earlier in the summer. We also note the sale of 600 tons of Old Car Wheels for next year's delivery at $21. Quotations on gross tons, car lots, f.o.b. Chicago, are as follows:

Old Iron Rails	$23.00 to $23.50
Old Steel Rails, 4 ft. and over	17.00 to 17.50
Old Steel Rails, less than 4 ft.	16.00 to 16.50
Heavy Relaying Rails, subject to inspection, 50 lb. and under	28.50 to 29.00
Old Car Wheels	19.50 to 20.00
Heavy Melting Steel Scrap	16.00 to 16.50
Frogs, Switches and Guards	16.00 to 16.50
Mixed Steel	13.50 to 14.00

The following quotations are per net ton:

Iron Fish Plates	$18.50 to $19.00
Iron Car Axles	24.00 to 24.50
Steel Car Axles	20.00 to 20.50
No. 1 Railroad Wrought	17.00 to 17.50
No. 2 Railroad Wrought	15.50 to 16.00
Railway Springs	15.00 to 15.50
Locomotive Tires, smooth	15.00 to 15.50
No. 1 Dealers' Forge	13.00 to 13.50
Mixed Busheling	11.00 to 11.50
Iron Axle Turnings	10 00 to 10.50
Soft Steel Axle Turnings	10.00 to 10.50
Machine Shop Turnings	9.50 to 10.00
Cast Borings	8.50 to 9.00
Mixed Borngs, &c.	8.50 to 9.00
No. 1 Mill	9.50 to 10.00
No. 2 Mill	8.50 to 9.00
No. 1 Boilers, cut to Sheets and Rings	10.00 to 10.50
No. 1 Cast Scrap	15.00 to 15.50
Stove Plate and Light Cast Scrap	12.00 to 12.50
Railroad Malleable	14 50 to 15.00
Agricultural Malleable	14.00 to 14.50

A wage scale has finally been adopted governing the 18-in. continuous mill at the Brown-Bonnell Works of the Republic Iron & Steel Company, Youngstown, Ohio. The men agreed to accept a reduction of about 6 per cent. in wages.

Pittsburgh.

PARK BUILDING, August 29, 1906.—(*By Telegraph.*)

Pig Iron.—We note a continued active inquiry for Pig Iron, and, with the available supply of Bessemer, Basic and Foundry Iron practically sold up through the first quarter, prices are naturally very strong and show indications of going higher, especially on Foundry. During the week there have been sales of about 35,000 tons of Basic and upward of 10,000 tons of Bessemer. The Lackawanna Steel Company has bought 25,000 tons of Basic for delivery through the first half of next year, on the basis of $18, Valley furnace, while other smaller sales of Basic have been made, aggregating about 2000 tons, at $18 to $18.25, Valley furnace. We note a sale of 1000 tons of Bessemer, 500 for September and 500 for October, at $18.50, Valley furnace; also a sale of 4000 tons of Bessemer, deliveries running in January, at the reported price of $18.75, Valley furnace. We quote Bessemer Iron at $18.50 to $18.75 and Basic at $18 to $18.25, Valley furnace. In Foundry Iron the purchase of 16,000 tons by the Westinghouse Electric & Mfg. Company for its Allegheny and Cleveland works was the largest sale of the week. The greater part of this tonnage was bought on the basis of $18, Valley furnace, for Northern No. 2 Foundry, but we note that 1000 tons went in at $17.75. There is a heavy inquiry for Foundry, some large consumers desiring to cover through the first half of next year, and prices are higher, Northern No. 2 now being held at $18.50 to $18.75, Valley furnace, the lower price being absolute minimum of the market. Forge Iron has shown a sharp advance, and Northern grades are now held at $17.50, Valley furnace, or $18.35, Pittsburgh.

Steel.—The shortage in the supply of Steel seems to be getting worse, and parties who have any Steel to offer can get almost any prices they ask. Bessemer Billets are held from $28 to $29, while Open Hearth Billets are quoted at $29 to $30. Sheet Bars are held at $29.50 to $30 for random lengths. Forging Billets are held at $34 to $35, Pittsburgh.

(*By Mail.*)

The past week has not been so active as its predecessor as regards sales of Pig Iron, but the market is as strong as ever, with indications favoring higher prices. Outside of 16,000 tons of Foundry Iron bought by the Westinghouse Electric & Mfg. Company for its Cleveland and Allegheny works, the market has been rather bare of sales. Bessemer Iron for balance of this year delivery is very scarce and readily commands $18.25 to $18.50, Valley furnace. Basic Iron is very strong at $18, Valley, and there is quite an active demand. Following the heavy sales of Foundry Iron to the Westinghouse Company higher prices are being asked, some furnaces quoting Northern No. 2 at $18.50 at furnace and higher. Forge Iron is moderately active and is held at about $17 at furnace. The supply of Steel does not show any betterment, but with the Bessemer plant of the Republic Iron & Steel Company at Youngstown running very successfully and selling a good tonnage of Billets, Sheet and Tin Bars in the open market, together with the output of the new Bessemer plant at the Youngstown Sheet & Tube Company, which has run very satisfactorily since being started, the shortage of Steel ought to ease up before a great while. Tonnage in all lines of Finished Iron and Steel continues enormously heavy, some of the large makers reporting their mail orders larger than at any previous time. We note an active inquiry for Coke, with prices very strong, while Scrap is moving more freely than for some months.

Ferromanganese.—Prices on Ferro continue very strong and there is a fairly active demand. We quote 80 per cent. Ferro for spot shipment at $95, while for September delivery $90 is quoted. For shipment over the balance of this year $85, Pittsburgh, is the ruling price.

Wire Rods.—Open Hearth Rods can hardly be obtained at any price, while Bessemer Rods are very firm at $34 to $34.50. Chain Rods are held at $35, Pittsburgh.

Skelp.—The market is very firm and some sellers are asking higher prices. We quote: Grooved Steel Skelp, 1.57½c. to 1.60c.; Sheared Steel Skelp, 1.60c. to 1.65c.; Grooved Iron Skelp, 1.65c. to 1.70c.; Sheared Iron Skelp, 1.75c. to 1.80c., Pittsburgh, these prices being for ordinary widths and gauges.

Steel Rails.—The feature of the market is the heavy demand for Light Rails, which is larger than the mills can supply. We quote 16 to 20 lb. sections at $31 and 25 to 45 lb. sections at $30. It is reported that the Missouri, Kansas & Texas has placed about 20,000 tons of Steel Rails for next year, but this is not verified. The Carnegie Company entered orders the past week for upward of 20,000 tons for next year delivery. We quote Standard Sections at $28 at mill.

Structural Materials.—The Jones & Laughlin Steel Company has sold about 1200 tons of Steel for the *Evening Bulletin* building in Philadelphia. The American Bridge Company has booked a good deal of tonnage in Bridge work

in the past week. All the Structural concerns are congested with tonnage, and some of them are indifferent about taking on more business until they have cleaned up some of their present contracts. Prices continue very firm, but reports that an early advance is contemplated are denied. It will be the policy of the leading interests to keep prices of Structural Steel on a conservative basis. We quote: Beams and Channels, up to 15-in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x ¼ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-in. are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—A moderate amount of new business is being placed, but specifications on contracts are heavy, and will take the greater part of the output of the mills for the rest of this year. There is more trouble in getting deliveries on Universal Mill Plates than on Sheared, the mills being from two to three months behind in deliveries on the former. Concessions made in July by a Plate mill in the Wheeling district and also by several other smaller mills have practically disappeared and prices are firm. We quote: Tank plates, ¼ in. thick, 6¼ in. up to 100 in. in width, 1.60c., base, at mills, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16.in-Plates on thin edge	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in	.05
Plates over 110 to 115 in	.10
Plates over 115 to 120 in	.15
Plates over 120 to 125 in	.25
Plates over 125 to 130 in	.50
Plates over 130 in	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—With Sheet Bars selling at $29.50 to $30, and very hard to get at these prices, an advance of at least $2 a ton in Black and Galvanized Sheets is expected, to be announced any day by the leading interest. Practically all the Sheet mills are sold up for the rest of this year, and premiums have been paid in some cases over official prices for prompt deliveries. The demand is unusually heavy, and the mills are swamped with specifications on contracts. Prices are firm, and we quote: Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.65c., and No. 30, 2.75c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.55c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.80c., and No. 30, 4.05c. We quote No. 28 Gauge Painted Roofing Sheets at $1.75 per square, and Galvanized Roofing Sheets, No. 28 gauge, at $3.10 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances for small lots from store.

Bars.—Reports that a meeting of the Steel Bar makers had been called for Friday, August 31, to discuss the advisability of advancing prices is denied here. Several large Steel Bar interests are opposed to any advance in prices, and will strongly favor keeping the market on its present basis. The demand for Steel Bars continues active, and specifications are being received in such heavy volume that the mills are getting still further behind in deliveries. The Carnegie, Jones & Laughlin and Cambria Steel companies are said to have their entire output of Steel Bars sold up into next year. The Cambria Steel Company is not quoting below 1.60c., but other makers continue to name 1.50c. for indefinite deliveries. We also note a heavy demand for Iron Bars, the minimum of the market now being 1.60c., Pittsburgh, this price having been established by the Republic Iron & Steel Company and other makers about two weeks ago. The mills rolling Iron Bars are so far behind in deliveries that premiums are being paid in some cases for prompt shipment. We quote Steel Bars at 1.50c., and Iron Bars at 1.60c., base, half extras.

Hoops and Bands.—Little new tonnage is being placed, most large consumers having covered their requirements in the early part of this year for shipment up until fall. Specifications on these contracts are coming in very freely. We quote Steel Hoops at 1.90c. and Bands for all purposes at 1.50c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of $2 a ton being charged for less than carloads.

Tin Plate.—Reports that the American Sheet & Tin Plate Company will announce an advance of 15c. per base box in Tin Plate within a few days are not officially confirmed. It is believed, however, that the announcement of some advance will be made in a short time, possibly before this week is out. The larger Tin Plate interests are somewhat indifferent about selling ahead at present prices, but have done so in some cases for delivery into first quarter of next year only. There is a continued scarcity in the supply of Tin Bars, and none of the mills is able to operate to full capacity on this account. We quote Tin Plate at $3.75 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carloads and larger lots.

Railroad Spikes.—The demand continues enormously heavy. All makers of Spikes have their product sold up for the next three or four months, and are much behind in deliveries. We quote Railroad Spikes at $2.30 to $2.40 for indefinite delivery, and note that $2.50 per 100 lb. is being paid for prompt shipment.

Merchant Steel.—Some belated contracts for Shapes have recently been placed by a Western implement maker and specifications on contracts continue heavy, being in excess of shipments. A meeting of the Shafting Association was held in Atlantic City last week, but no change was made in prices. We quote: Planished or Smooth Finished Tire Steel, 1.70c.; Iron Finish, up to 1½ x ½ in., 1.65c., and Iron Finish, 1½ x ½ in. and larger, 1.50c., base, Pittsburgh, and Channels for solid rubber tire are quoted as follows: ¾, ⅞ and 1 in., 2c., and 1⅛-in. and larger, 1.90c.; Toe Calk Steel, 2c. to 2.05c.; Railway Spring Steel, 1.75c. to 1.80c.; Cutter Shoes, 2.20c. to 2.25c.; Flat Sleigh Shoe, 1.50c. to 1.55c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades and 12c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. discount in carloads and 45 per cent. in less than carloads, delivered in base territory.

Spelter.—There is a fair demand and the tone of the market is moderately strong. We quote best grades of Western Spelter at 5.90c., St. Louis, or 6.02½c., Pittsburgh. On a firm offer this price might be slightly shaded.

Merchant Pipe.—The demand for the smaller sizes of Merchant Pipe continues active, while on Line Pipe most of the mills are practically filled for the rest of this year. Prices are firm, but there are no indications of an early advance being made by the leading interest. The extreme discount on Merchant sizes of Steel Pipe remains at 81 and 5 per cent. off, to the large trade. Official discounts for carloads, which continue to be shaded one point or more, are as follows:

Merchant Pipe.

	Jobbers, carloads. Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
	%	%	%	%
⅛ and ¼ in	72	56	69	53
⅜ in	74	60	71	57
½ in	76	64	73	61
¾ to 6 in	80	70	77½	67½
7 to 12 in	75	60	72½	57
Extra strong, plain ends:				
⅛ to ⅜ in	65	53	62	50
½ to 4 in	72	60	69	57
4½ to 8 in	68	56	65	53
Double extra strong, plain ends:				
½ to 8 in	61	50	58	47

Boiler Tubes.—Specifications on Locomotive Tubes are coming in freely, but new tonnage being placed with the mills on Merchant Tubes is rather light, prices on these being more or less shaded. Official discounts on carload lots, which are being shaded to some extent, are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in	45	50
1¾ to 2¼ in	45	62
2½ in	50	64
2¾ to 5 in	57	70
6 to 13 in	45	62

Iron and Steel Scrap.—The demand is fairly active, but only a limited tonnage is being sold, mainly for the reason that dealers are inclined to hold their Scrap in the belief that prices will be higher. Heavy Steel Melting Scrap has advanced in sympathy with Bessemer and Basic Iron, and is now held firmly at $17 per gross ton.

Coke.—A continued shortage in labor in the Connellsville region is interfering seriously with the output of Coke, the demand for which is unusually heavy. A growing tendency on the part of Coke producers is to make contracts for the sale of their Coke on a sliding scale basis; that is, to give so many tons of Coke for 1 ton of Bessemer Iron. A number of contracts that will run over the balance of this year are on the basis of 7½ tons of Coke for 1 ton of Bessemer Pig Iron, but we note that several important contracts for Coke for delivery over all of next year have been made on the basis of 7 to 1. If the present price of $18.25 for Bessemer Iron is maintained through first quarter of next year, it will means that several leading Coke concerns will get about $2.60

per ton, at oven, for Furnace Coke. On some of these contracts a maximum price of $19 and a minimum price of $11 has been made for Bessemer Iron. We quote best grades of Connellsville Furnace Coke at $2.80 to $2.85, and 72-hour Foundry at $3 to $3.25, at oven.

Philadelphia.

REAL ESTATE TRUST BUILDING, August 28, 1906.

The uneasy feeling which prevailed last week in regard to a shortage of Pig Iron has become somewhat intensified this week. Inquiries would lead to the impression that there was an actual famine as regards spot lots, and in some cases extraordinary prices have been paid for immediate shipments. In one or two instances it is claimed that over $21 at furnace has been paid for No. 2 X, and a considerable tonnage could be booked at that figure, or more, for deliveries during the first half of September. This is not regarded as by any means a fair criterion of the market, however, but it unsettles things so much that it is difficult to say just what should be quoted as a fair average price. The truth of the matter is that buyers have become thoroughly scared, and, instead of feeling assured that the tendency from this time forward is likely to be toward easier conditions, they act as though every chance to get hold of Pig Iron will be their last for months to come. If the millions of tons sold were guaranteed for delivery during 1906 there might be some cause to fear being shut out, but there is a limit to consumption, even if there is no limit to buying and selling. A pretty clearly defined tonnage of Pig metal can be melted and no more, but if people choose to buy and sell twice as much as can be used there is nothing to hinder them from doing so, although it may be a very unsatisfactory operation in the long run. The unexpected advance in prices is sure to stimulate production, and if December does not show an increased output of 100,000 tons over August it will be another surprise in this year of many surprises. It is satisfactory to find increasing activity in finished products. A few mills are closed on account of wage differences, but as a rule a full output is being made, all of which is promptly specified. Taking everything into account, conditions are excellent and prospects indicate further improvement as the season advances.

Pig Iron.—It would involve some risk to say what the course of the market will be during the next few weeks. The most experienced men in the trade believe that buyers are overdoing it, but if they are determined to get their orders placed there is no alternative for sellers but to quote prices to suit themselves. Such methods unsettle the market and in the long run will cause a good deal of trouble, but the buying fever is on and will have to run its course. Sales of No. 2 X Foundry have in some cases been made at figures ranging from $20 to $21, at furnace, and may be used by those who are working for higher prices as an indication of actual values. This, however, would be very misleading, as there are others who are willing to quote $19 to $19.50 at furnace to their regular trade. The question arises, which of these extremes will win out in the long run, as business is being done at prices all the way from the lowest to the highest figures named. The high figures are of course for spot lots, or for shipments during the first half of September, the lower for the first quarter of 1907. Which end will be the first to give way? Will the lower figure continue, or will the higher be modified until it gets nearer to $20, delivered? These are questions which involve serious consequences, and it would not be safe to be too confident on either side, although it does seem as though the higher quotations were due to emergencies which can only be temporary. As we have already mentioned, consumption is so great that it cannot increase much, while there is a considerable margin for a larger supply of Pig Iron, which will receive additional stimulus by the advance in prices. If this theory works out as expected, easier conditions should be met with during the last four months of the year, although more or less shortage may perhaps be felt for some weeks before there is any great relief. When that time comes it will no doubt make a considerable change in the attitude of buyers, and it will be well if prices are not unfavorably affected. That point has not been reached yet, however, and at this writing prices are firm at the highest figures of the year. As we have already shown, recent sales cover a much wider range of prices than usual, the following being conservative figures for deliveries at nearby points during the last quarter of the year or the first quarter of 1907:

No. 1 X Foundry	$21.00 to $21.50
No. 2 X Foundry	19.75 to 20.25
No. 2 Plain	19.00 to 19.50
Standard Gray Forge	17.50 to 18.00
Ordinary Gray Forge	17.00 to 17.25
Basic	18.25 to 18.50
Low Phosphorus	24.50 to 25.00
Malleable	19.50 to 19.75
Bessemer	20.50 to 21.00

Steel.—The demand shows a steady increase, and mills find great difficulty in making shipments as promptly as buyers require. This is specially the case with Forging Billets, which command anywhere from $33 to $35, while ordinary Billets are readily taken at $29.50 to $30.

Steel Alloys.—Prices are firm, but very irregular, and depend upon date for deliveries. Ferromanganese would probably range from $90 for early deliveries down to $85 to $87.50 for last quarter, and $80 to $82.50 for the first quarter of 1907. Ferro silicon is quoted around $92.50 to $97.50, and 20 per cent. Spiegel $35 to $36. Buying, however, is not active, so that prices are all, more or less, nominal.

Plates.—There is plenty of business, but mills are making pretty good deliveries, and while there is every prospect of activity during the remainder of the year, buyers are not likely to be inconvenienced for want of material. It is noticeable, however, that the quantities required by individual customers are larger than ever before, indicating that consumers of Plates have increased their capacity, and their business in fair proportion to that made by manufacturers. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.73½	1.78½
Flange or Boiler Steel	1.83½	1.88½
Marine	2.13½	2.18½
Locomotive Firebox Steel	2.23½	2.28½

The above are base prices for ¼-in. and heavier. ing extras apply.	The follow- Extra per 100 pounds.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G	.15
No. 9, B. W. G	.25
Plates over 100 to 110 in	.05
Plates over 110 to 115 in	.10
Plates over 115 to 120 in	.15
Plates over 120 to 125 in	.25
Plates over 125 to 130 in	.50
Plates over 130 in	1.00

Structural Material.—The demand keeps up to the high water mark and bids fair to cover it before the end of the year. The new mills have been a great relief to the market, however, as without them the difficulty in getting material would have been quite serious. There is considerable local business in prospect, which includes two new theatres, one on Broad and Sansom streets, the other on Broad street and Girard avenue. These are to be in every respect large, up to date structures, and together will require 5000 to 8000 tons of Material. Prices unchanged, as follows: Beams, Angles and Channels, 1.83½c. to 2c., delivered.

Bars.—The demand for Bars is improving, and such mills as are working are running full time. There are several that are closed, however, owing to wage disputes, so that the local production is a good deal below the normal. Steel Bars are scarce and deliveries are not promised inside of 30 to 60 days. On the whole the outlook indicates great activity during the remainder of the year, with firm if not higher prices, which at present are 1.73½c. to 1.78½c. for either Iron or Steel.

Sheets.—There is a heavy demand for thin Sheets, for which the mills are somewhat behind in their deliveries. The lower numbers are less active, however, but there is plenty of business at firm prices as follows for part carloads and a tenth less for mill shipments: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c., and No. 28, 2.80c.

Old Material.—The market is in a very pecular condition, making it impossible to give very close quotations. Dealers are willing to take anything that may be offered at the inside figures quoted below, but they have nothing for sale unless at an advance on the outside figures. It looks a good deal like a corner, or an attempt to corner, but for the present consumers are not showing much interest in the matter, as they regard the inside figures as high enough. As nearly as can be given the range of prices would be about as follows for deliveries in buyers' yards:

Steel Crops	$17.50 to $18.00
No. 1 Steel Scrap	17.25 to 17.75
Low Phosphorus Scrap	22.00 to 22.50
Old Steel Axles	21.00 to 22.00
Old Iron Axles	28.00 to 28.75
Old Iron Rails	21.50 to 22.50
Old Car Wheels	17.00 to 17.50
Choice Scrap, R. R. No. 1 Wrought	20.50 to 21.00
Choice No. 1 Yard Scrap	18.50 to 19.00
Long and Short	16.50 to 17.00
Machinery Scrap	16.50 to 17.00
Wrought Iron Pipe	15.00 to 15.50
No. 1 Forge Fire Scrap	13.50 to 14.00
No. 2 Light Ordinary	10.50 to 11.00
Wrought Turnings	13.00 to 13.50
Axle Turnings, Choice Heavy	13.50 to 14.00
Stove Plate	12.50 to 13.00
Cast Borings	10.75 to 11.25

The Stevens Institute Alumni Association, Hoboken, N. J., has just issued the directory for 1906 of the alumni of that institution. An alphabetical list is given, also a geographical list, which is followed by the business connections of the alumni, the list of companies being subdivided by an alphabetical classification, according to products.

Birmingham.

BIRMINGHAM, ALA., August 26, 1906.

Pig Iron.—Sales the past week have necessarily been light, owing to the inability of producers to deliver the tonnage desired during the remainder of this year. The market is now strong at $15.50 for No. 2 Foundry, with a number of sales reported at $16, and even this latter price is being refused by some of the producers. An effort is being made by the furnace people to confine each melter's purchases to his actual requirements, and customers are requested not to specify shipment in advance of needs, as is always the case when the demand is large and the supply short. For the past 30 days the majority of the furnaces here have also cut out the brokers, refusing to sell to them directly or quote through them. Very little speculative Iron will therefore have to be contended with after the furnaces have sold their production for the year. Inquiries for delivery during the first half of 1907 are becoming more numerous, but so far only a comparatively small amount of business has been booked, the furnaces as a rule preferring to sell for that delivery just at present. The prices on this business are understood to be from $14.50 to $15 on a No. 2 Foundry basis. The efforts being made to increase production are meeting with success, and the remaining months of the year will doubtless be record breakers. The Tennessee Company started its Little Belle furnace at Bessemer the past week, and is now probably producing more Iron than ever before in its history, only one stack, and that a small one, being out of blast at the present time. Labor conditions are rapidly improving, and are now reported better than at any time for the past two years. The one thing now necessary for an increased production of Pig Iron is a larger supply of coke, but as every Iron concern is building additional ovens this will not long be a factor.

Cast Iron Pipe.—The general condition of the market is unchanged, with but little new business being taken on. Foundries are endeavoring to run to their full capacity, but owing to the extremely hot weather production is far from satisfactory. Quotations on Water Pipe are approximately as follows: 4 to 6 in., $30; 8 to 12 in., $29; over 12-in., $27.50, with $1 per ton extra for Gas Pipe.

Old Material.—The Scrap market is again active, with a greater demand for Cast than can be supplied. Inquiries for Wrought are coming in, but dealers are holding for better prices than those being offered. We quote the following prices per gross ton, f.o.b. dealers' yards:

Old Iron Rails	$18.50 to $19.00
Old Iron Axles	18.00 to 18.50
Old Steel Axles	16.00 to 17.00
Old Car Wheels	16.50 to 17.00
No. 1 Railroad Wrought	15.00 to 15.50
No. 2 Railroad Wrought	14.00 to 14.50
No. 1 Country Wrought	13.00 to 13.50
No. 2 Country Wrought	11.00 to 11.50
Wrought Pipe and Flues	11.50 to 12.00
Railroad Malleable	12.00 to 12.50
No. 1 Steel	12.00 to 12.50
No. 1 Machinery Cast	13.00 to 13.50
Stove Plate and Light Cast	9.25 to 9.50
Cast Borings	7.00 to 7.50

Arrangements for the consolidation of the Lacey-Buek Iron Company and the Chattanooga Iron & Coal Company with the Southern Steel Company have been practically completed, and it only remains for the stockholders of the Southern Steel Company to go through the formality of voting to increase its capital at a meeting to be held on September 1. This consolidation is regarded in Iron and Steel circles here as a matter of considerable importance, inasmuch as the valuable ore properties thus acquired will enable the Southern Steel Company to expand its manufacturing business on large and enduring lines. E. T. Schuler will continue as president, with C. E. Buek as vice-president.

Cincinnati.

FIFTH AND MAIN STS., August 29, 1906.—(*By Telegraph.*)

Pig Iron.—Tremendous inquiry from every direction, embracing Northern Foundry, Bessemer, Basic and Southern Irons, has been the record for the week. The demand for spot Iron continues unabated at prices above the schedule, with a supply not always readily obtainable. Southern furnaces have opened their books for first quarter and first half of next year on a $15, Birmingham, basis, at which figure a large tonnage has been sold, while for nearby delivery those furnaces who have any Iron to sell are asking perhaps 50c. premium. Some of the largest melters are known to be unprovided with sufficient Iron to carry them through the third quarter of the year, and are keeping in close touch with the situation, waiting for an opportunity to cover their requirements. Several very large sales were made in this and contiguous territory during the week for both this and next year's delivery. Reports from those entirely conversant with the situation show a limited stock on furnace yards in Southern territory, which, taken in conjunction with the general labor and Coke situation, is proving to be a serious handicap on any increase in production that otherwise might result. The situation in the North is practically along similar lines, most of the furnaces showing a limited tonnage remaining unsold for the remainder of the year, and spot Iron selling at a premium if it can be obtained. Taken as a whole, the month just closing has been one of the largest for years in sales of both Pig Iron and Coke. Freight rate from Birmingham is $3. A typographical error last week stated this rate to be $30. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$18.50 to $19.00
Southern Coke, No. 2	18.00 to 18.50
Southern Coke, No. 3	17.50 to 18.00
Southern Coke, No. 4	17.00 to 17.50
Southern Coke, No. 1 Soft	18.50 to 19.00
Southern Coke, No. 2 Soft	18.00 to 18.50
Southern Coke, Gray Forge	16.25 to 16.75
Southern Coke, Mottled	15.75 to 16.25
Ohio Silvery, No. 1 (8 per cent. Silicon)	23.15
Lake Superior Coke, No. 1	19.15 to 19.65
Lake Superior Coke, No. 2	18.65 to 19.15
Lake Superior Coke, No. 3	18.15 to 18.65
Car Wheel Irons.	
Standard Southern Car Wheel	$25.50 to $26.00
Lake Superior Car Wheel	24.50 to 25.00

Coke.—Ruling quotations are firm, and the market is strong and active. While there are some delays noted on account of car shortage, the general situation is fairly satisfactory. We quote the best brands of Connellsville and Virginia Foundry from $3.25 to $3.50, f.o.b. ovens.

Finished Iron and Steel.—There has been some development along Structural lines, and the market is somewhat stronger. Quite a tonnage is in sight for next year, and contracts have been above the normal. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 2c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 1.85c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, ¼-in. and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16 gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14 gauge, in carload lots, 2.05c.; in small lots, 2.60c.; Steel Tire, 1 x ¼ in. or heavier, 1.83c., in carload lots.

Old Material.—The market is quite active and prices are strong. The mills have been large buyers during the week, and a heavy tonnage has thus been disposed of. We quote dealers' prices, f.o.b. Cincinnati, about as follows: No. 1 Railroad Wrought Scrap, $14.50 to $15 per net ton; Cast Borings, $5 to $6 per net ton; Steel Turnings, $7 to $8 pet net ton; No. 1 Cast Scrap, $13 to $14 per net ton; Iron Rails, $19 to $20 per gross ton; Steel Rails, rolling mill lengths, $15 to $15.50 per gross ton; Relaying Rails, 56-lb. and upward, $28 to $29 per gross ton; Iron Axles, $21 to $22 per net ton; Car Wheels, $17 to $18 per gross ton; Low Phosphorus Scrap, $17 to $18 per gross ton.

Cleveland.

CLEVELAND, OHIO, August 28, 1906.

Iron Ore.—Strong pressure is being brought to bear on the Iron Ore companies to get them to discourage the buying of Ore until the market has had a little time to cool down. The larger Iron and Steel interests realize that the market is rapidly developing runaway tendencies. The situation is getting to such a point that it is not a matter to be determined by an individual maker or group of makers, but is being governed more by general trade conditions. The conservative policy recently prevailing in the Pig Iron trade is being swept aside by a fever on the part of buyers. This feeling has been communicated to a large extent to the furnace interests, who now want to cover their Ore needs for next year. The same sort of impulse is back of the desire to buy Iron Ore as has recently been shown in the Pig Iron trade. There is now apparently a shortage of Iron Ore. At the start this was confined to the higher grades. It has since extended to the low grades. Shippers have notified furnace interests that it will be impossible to live up entirely to the full terms of the contracts made earlier in the year, and have given notice that a radical curtailment of the original amounts expected to be shipped must be taken into consideration. The movement of Ore down the lakes during the past week was subject to another check, mainly due to operating conditions in the Northwest. Labor is short, for one thing. Forest fires were partly responsible for another. Boats were therefore not so much in demand as they have been, and they were permitted to go into other trades. This delay simply put off the time when wild boats must be chartered at higher figures, and seemed to increase the probability that wild rates must go higher. There is talk among the vessel interests of $1 rates before the middle of October, and this seems likely.

Pig Iron.—The Pig Iron trade in this territory, both as to Foundry and the Steel making Irons, has reached that stage where it is confessed the recent conservative policies are abandoned perforce. Individual furnace interests, desiring

to adhere to the old policy of price conservatism, realize the futility of such an effort in view of the general conditions and are giving in reluctantly. Spot Foundry Iron is virtually impossible to obtain. A few driblets are sold now and then and the price usually runs above $20. Many of the furnaces are sold up for the first quarter of next year as completely as they care to be. Generally through this territory furnaces are quoting $19 to $19.50 in the valleys for No. 2 for first half delivery and buyers seem eager even at that figure. Basic is no easier. Sales have been made lately at $18.50 in the valleys for first half delivery. The same is true in every particular of Bessemer.

Coke.—Coke is still strong, with many of the producers refusing to quote for first half contracts. The best grades of 72-hour Foundry are selling at $3.50, and Furnace is selling around $2.90 to $3, at oven.

Finished Iron and Steel.—A shortage of labor is beginning to show its effects in the finished trade. Shops report that it is difficult to keep a supply of men sufficient to do the work. The hot weather during the past two weeks has also caused some of the mills to lessen their production. It has been found impossible to keep the men working full time. One producer of Bar Iron shows by his books that his output was only 50 per cent. of normal as a result of the hot weather. The cool wave which came with the beginning of this week was very welcome. The demand for all grades of Steel is so great that the main difficulty is in getting a supply. While the structural mills are not sold up as far ahead as they were at the beginning of the year, the sales departments say the market is stronger now than then. New buying is coming from a wider territory, and specifications against old contracts are better. One car company in Cleveland took one of the biggest orders in its history during the week. Railroad buying of cars and engines continues, and suburban railroads here are in the market for new equipment and track supplies. Ships are also going to be ordered shortly. Bar Iron production has been so short that all mills producing it have made their quotation 1.60c., Pittsburgh. Sheets are also in demand, and mills are anywhere from 8 to 12 weeks behind their orders. Most of the sales are made out of stock, with prices quoted at 2.15c. for No. 10 Blue Annealed; 2.80c. for No. 28 one-pass cold rolled, and 3.80c. for No. 28 Galvanized.

Old Material.—The market has grown stronger under the stimulus of the buying in Pig Iron. Prices are revised as follows, gross tons, f.o.b. Cleveland: Old Steel Rails, $15.50 to $16; Old Iron Rails, $21 to $22; Iron Car Axles, $18.50 to $19.50; Heavy Melting Steel, $15.50 to $16. Net tons; Cast Borings, $8.50 to $9; No. 1 Busheling, $13 to $13.50; No. 1 Railroad Wrought, $16 to $16.50; No. 1 Cast, $15 to $15.50; Iron and Steel Turnings and Drillings, $10 to $10.50.

Metal Market.

NEW YORK, August 29, 1906.

Pig Tin.—Dullness has ruled during the week, although in some quarters small sales have been made from day to day. The general consumers, however, seem to be holding aloof and awaiting the arrival of more metal from Europe. Prices have gradually fallen from last week's level of 41.50c., as on Monday of this week, when Tin ex-Minnetonka could be had at 40.60c. On Tuesday the price was again a trifle lower, at 40.40c. to 40.50c. To-day, in response to lower cables from London, which were £182 5s. for spot and £182 15s. for futures, the market eased off further to 40.25c., New York. There appears to be some difference of opinion as to whether the bulk of the Tin which came on the Minnetonka was shipped to the interior or not. In view of the light arrivals and the activity in the Tin Plate mills it hardly seems probable that any large amount went into store. The arrivals so far this month aggregate 3198 tons, and there are afloat for American ports 1356 tons.

Copper.—A continuance of the improved demand which was noted last week takes the form of free buying for future position, and sales have been made well into next year at full prices. It appears to be the policy of the larger producers of Electrolytic to hold prices firm at 18.50c., delivered 30 days, for future positions, making no concessions either for large or export orders. Should there come a sudden demand for immediate deliveries prices would probably be forced to higher figures through a demand for premiums for nearby positions. From present indications the outlook is most favorable to producers of metal with little likelihood of lower prices during the remainder of the year. High grade Lake is quoted at 18.75c. to 19c., and scarce. Electrolytic can be obtained at 18.50c., although for prompt shipments premiums are obtained, and sales have been made in Europe on a basis of 10 to 15 points above this price. Casting grades can be had at 18.25c. to 18.37½c. There is said to be very little high grade Lake for immediate delivery, the largest producer of this grade of Copper having made some heavy sales for European delivery. Exports are large, amounting to 17,543 tons so far this month, and indications are not wanting that when Southern and Pacific ports are heard from the total exports will foot up to between 19,000 and 20,000 tons. Takings into Germany are especially heavy. In this connection it is interesting to note the effect on the Copper market of the recent earthquake in South America. The total production of Copper in Chili amounted in 1904 to 31,110 tons; total exports to England and Germany were 22,975. The exports to the United States for the calendar year are not available at this writing, but undoubtedly were in the neighborhood of 1600 tons. This shows that the total exports from Chili for the year were slightly above the average monthly exports from the United States, and, as yet, there is no good reason to think that the Copper mines in that country have been seriously damaged. In a small way prices on Lake are very firm, cask lots being freely sold at 19.50c. For cask lots of Electrolytic 18.87½c. is quoted.

Pig Lead.—There is an excellent demand and Lead for prompt shipment is scarce, in spite of higher prices. The market in New York may be quoted at 5.85c. to 5.90c., and in St. Louis is firm at 5.75c. The principal producer, which was shipping orders about 20 days after their receipt last month, now cannot make deliveries before the latter part of September or first of October. Its price and terms continue unchanged. The London market closes to-day at £17 10s.

Spelter.—There seems to be a steady demand for this metal, but prices appear to be in a rut, with little or no change from week to week. In St. Louis prices are 5.90c., and in New York 6.05c. to 6.10c. is asked. The London market is steady at £27 5s.

Antimony.—The market is a trifle firmer, and it is said that Cookson's, which is very scarce, cannot be obtained at less than 25c. Hallett's is offered at 24c. in large lots, and outside brands can be had at 22.50c. to 23.50c. No large shipments of Cookson's are available before October, and the outlook points toward higher prices.

Aluminum.—There is still considerable difficulty in securing supplies promptly, although the principal producer is making efforts to secure a better supply. Prices are unchanged. No. 1 Ingot can be had at 36c. and No. 2 at 34c. per lb.

Nickel.—Prices are unchanged. Large lots can be had at 45c., and smaller quantities at 55c. to 65c.

Tin Plate.—The heavy demand which has been going on for some time in the interior is just beginning to be felt in this market. Bright Plates are in especially good inquiry. For 100-lb., 14 x 20, IC Coke Plates, $3.94 is quoted, f.o.b. New York, and $3.75, f.o.b. Pittsburgh, subject to the usual discounts.

Old Metals.—Advances of from ⅛c. to ¼c. have been the rule in all kinds of Copper and Brass Scrap, except Heavy Brass, which is unchanged from last week at 12.50c. Consumers are buying only as their needs warrant, and are not disposed to make any speculative commitments. Old Lead is also higher, due to the advance in Raw Material. Dealers' selling prices are as follows:

	Cents.	
Copper, Heavy Cut and Crucible	17.87½	to 18.00
Copper, Heavy and Wire	17.62½	to 17.87½
Copper, Light and Bottoms	16.00	to 16.25
Brass, Heavy	12.50	to 12.75
Brass, Light	10.00	to 10.25
Heavy Machine Composition	16.25	to 16.50
Clean Brass Turnings	11.00	to 11.25
Composition Turnings	13.50	to 14.00
Aluminum Scrap	26.00	to 28.00
Lead, Heavy	5.25	to 5.40
Tea Lead	5.00	to 5.15
Zinc Scrap	4.40	to 4.60

New York.

NEW YORK, August 29, 1906.

Pig Iron.—The order of the New York Air Brake Company for 20,500 tons of Northern Iron was placed in the past week. Deliveries are, in part, for the last four months of this year and extend into the second quarter of 1907. Southern furnaces are selling for 1906 delivery, with very little such Iron available at prices netting $16 at the furnace for No. 2, while for 1907 sales of Southern Iron have been made at $15 and $15.50 for No. 2 at Birmingham. The price for spot Iron is fixing the basis for forward deliveries to an increasing extent. Probably less than half the Foundry Iron buyers in the New York District and New England have covered for a portion or all of their wants in the first quarter or first half of 1907, but such business is increasing with each week. We advance quotations for tidewater deliveries to the following: Northern No. 1, $20.25 to $20.75; No. 2, $19.75 to $20.25; No. 2 Plain, $19.25 to $19.75. Southern Iron is sold at $20 to $21 for No. 1, and $19 to $20 for No. 2, according to deliveries. The freight from Birmingham to New York is $4.

Steel Rails.—Compared with some recent weeks, the tonnage of Steel Rail orders reported to-day is light. Practically all the following contracts are for 1907 delivery: Chicago & Western Indiana, 3000 tons; Lake Shore Elevated,

2300 tons; New Orleans & Northeastern, 1000 tons; Vicksburg, Shreveport & Pacific, 2000 tons; Alabama & Vicksburg, 1500 tons; Brooklyn Heights Railway, 1325 tons; Southern Indiana, 600 tons. The last two are trolley lines.

Structural Material.—The largest contracts on which fabricating companies are figuring are for bridge work. The most important is the requisition of the Harriman lines for 1907, the bridge companies having been asked to figure on a total of 20,000 tons. The Harriman contract is generally let in the fall, and deliveries begin early in the new year. If the two-track bridge is decided upon for the Baltimore & Ohio structure over the Susquehanna River which will replace the present bridge at Havre de Grace, Md., fully 15,000 tons of Steel will be required. New York erecting companies have received cable inquiries from Valparaiso for bids on new office buildings. These inquiries are scarcely in shape for action. In the main they come from the Valparaiso representatives of New York commission houses, who ask in an offhand way for estimates on Steel construction "for a three-story office building" or "for a four-story office building," &c. The actual details of a contract seem quite a distance from inquiries of this sort. Two long delayed local jobs of large tonnage are the Singer Building and the City Investment Company Building on Broadway. It is expected now that the Steel contracts for these structures will not be long in coming out. A number of contracts which involve from 400 to 1000 tons of Steel are pending in different parts of the country. These include a cement plant at a blast furnace in the Hanging Rock district, Ohio, and the McKeen Building at Indianapolis. The American Bridge Company has received the contract for a bridge for the Portland & Seattle Railroad, 800 tons; a Carnegie Steel contract for fabricated Steel, 500 tons, and a bank building at New Orleans, 475 tons. The hot weather and the high humidity have affected the output of Pittsburgh and other Pennsylvania mills considerably in the past week, and all are getting further behind on shipments of Structural Steel. From present indications there will be no opportunity to recover the lost ground in the coming fall, as reports point to a heavy business for the next few months. We quote as follows on mill shipments, delivery at tidewater points: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. the extra is 0.10c., and on Angles over 6 in., 0.10c. Beams and Channels out of stock are sold at 2.40c. to 2.50c.

Bars.—The stiffening of Bar Iron prices has had the usual effect of bringing into the market a number of buyers who have for some time been hesitating. A more decided disposition is shown to make contracts for future delivery. The strike situation among the Eastern mills shows no change, but indications are seen of growing dissatisfaction among the unemployed men, and it is expected that applications for work will soon begin to be received from them. Meanwhile the production of Bar Iron in Eastern territory is restricted. Best Refined Bar Iron is now firm at 1.74½c., tidewater, all the manufacturers having advanced to this price during the week. Steel Bars continue to be quoted at 1.64½c., tidewater, but the mills are so crowded with work that none can promise prompt shipment.

Plates.—The contract for three ferryboats for municipal service has been placed by the city of New York with the Harlan & Hollingsworth Company, Wilmington, Del. The Plates will therefore not be purchased through sales agencies in this city, which is a disappointment to the local trade. Although current business consists almost exclusively of small lots, orders have lately been growing more numerous, and it is thought that buyers are gradually working up to the point of placing contracts. The stiffening of raw material excites some fear of higher prices on Plates. Prices are unchanged, as follows, at tidewater on mill shipments: Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 2.14½c. to 2.24½c.; Fire Box Plates, 2.24½c. to 2.60c., according to specifications.

Cast Iron Pipe.—The situation is as strong as at any previous time this year. Consumers are unable to get all the Pipe needed for this season's use, and even those having contracts are clamoring for deliveries. Orders continue to be placed for shipment at the convenience of manufacturers, but anything thus sold now means winter delivery. Quotations are firm at $31 to $32 per net ton on 6-in., at tidewater.

Old Material.—The market is active in practically all lines of Old Material. Even the rolling mills are now making purchases on a liberal scale of Wrought Scrap and other stock such as they need. The demand, however, is particularly strong for Cast Scrap and Stove Plate, and it seems impossible to satisfy the necessities of consumers, as local yards have been practically swept bare of accumulations of such stock. Heavy Melting Steel Scrap is also in sharp demand, dealers who have been caught short endeavoring to secure the limited supply of such material now available. Conditions are changing rapidly from day to day with the eagerness of buyers, and while our quotations have been somewhat advanced over those of last week, it is likely that by the time they reach our readers further advances may have taken place. Quotations for New York and vicinity are approximately as follows:

Old Iron Rails	$21.00 to $21.50
Relaying Rails	26.00 to 26.50
Old Steel Rails, rerolling lengths	18.00 to 18.50
Old Steel Rails, short pieces	16.00 to 16.50
Heavy Melting Steel Scrap	16.00 to 16.50
Standard Hammered Iron Car Axles	26.50 to 27.00
Old Steel Car Axles	20.50 to 21.00
No. 1 Railroad Wrought	19.00 to 19.50
Iron Track Scrap	17.00 to 17.50
No. 1 Yard Wrought, long	17.00 to 17.50
No. 1 Yard Wrought, short	16.00 to 16.50
Wrought Pipe	12.50 to 13.00
Light Iron	9.50 to 10.00
Cast Borings	9.50 to 10.00
Wrought Turnings	12.50 to 13.00
Old Car Wheels	17.50 to 18.00
No. 1 Machinery Cast	15.50 to 16.00
Stove Plate	11.00 to 11.50
Grate Bars	10.50 to 11.00
Malleable Cast	15.50 to 16.00

Iron and Industrial Stocks.

NEW YORK, August 29, 1906.

The stock market underwent rapid changes during the past week. The United States Steel stocks were for a time the leading feature of the market, and on Saturday United States Steel common sold up to 47¾, which is the highest point realized since 1902. On the same day Steel preferred sold up to 108¾. The common was therefore much stronger and more active than the preferred. The highest point reached by other active stocks during the week was as follows: Car & Foundry common 41⅞, Locomotive common 71¾, Steel Foundries preferred 45⅝, Colorado Fuel 59⅞, Pressed Steel common 54¾, Railway Steel Spring common 55, Republic common 31¼, Sloss-Sheffield common 79¾, United States Cast Iron Pipe common 48½. The failure of the Real Estate Trust Company in Philadelphia caused a general decline in stocks on Tuesday, during which lower prices were realized on some of the Iron and Steel stocks than during the whole of the previous week. The lowest point touched on active stocks at this time was as follows: Car & Foundry common 39⅝, Locomotive common 70, Steel Foundries preferred 44, Colorado Fuel 54⅝, Pressed Steel common 52½, Railway Spring common 53¼, Republic common 30⅜, Sloss-Sheffield common 76, United States Cast Iron Pipe 47, United States Steel common 45⅛, preferred 105¼. This morning the market recovered from its shock, and last transactions in active stocks up to 1.30 p.m. to-day are reported at the following prices: Can common 7¾, preferred 60; Car & Foundry common 40⅝, preferred 100¾; Locomotive common 72, preferred 113; Steel Foundries common 11⅛, preferred 44½; Colorado Fuel 56¾; Pressed Steel common 53¾, preferred 98½; Railway Spring common 53¼; Republic common 30½, preferred 99⅞; Sloss-Sheffield common 77; Tennessee Coal 158; United States Cast Iron Pipe common 47½, preferred 91; United States Steel common 47, preferred 107⅜.

In connection with the recent offering of $200,000 bonds of the C. Pardee Works, Incorporated, Perth Amboy, N. J., dated August 1, 1906, it is stated that the company's shafting plant, rolling mill and four open hearth furnaces cost $1,000,000. In 1905 the net profit over all expenses was $97,559. This year the business has greatly increased. The proceeds of this mortgage is to go directly into erecting a blooming mill. The entire issue is $300,000, of which $100,000 is reserved for later improvements.

Dividends.—Railway Steel Spring Company has declared the regular quarterly dividend of 1¾ per cent. on its preferred stock, payable September 20.

A Combined Fan and Turbine Engine.—For providing forced draft for boilers the L. J. Wing Mfg. Company, 136 Liberty street, New York City, has brought out a new device which is practically a fan and turbine engine in one machine. It can be erected at any place required, and a small pipe conveying steam to the turbine completes the equipment. The scheme of forced draft is claimed to combine the good features of a fan and a steam jet. The even, regular pressure of a fan is obtained with the added advantage of a small per cent. of dry high temperature steam thoroughly mixed with the air going through the fuel, giving the best conditions for complete combustion. The principal advantages cited for it are that all grades and sizes of coal may be burned with less formation of clinkers, that the capacity of any boiler may be increased 25 per cent if desired, and that steam may be held within two pounds of any required boiler pressure. This fan and turbine combination may also be used for humidifying air in factories and as an exhaust fan for drying goods, or removing steam, dust, foul air, &c.

The Youngstown Steel Plant Started.

The new Bessemer steel plant of the Youngstown Sheet & Tube Company at Youngstown, Ohio, which was fully described in *The Iron Age* of August 2, was successfully started on Wednesday morning, August 22, and has been operating very satisfactorily. Both converters are in operation, and up to the time of writing the works had not made a single cobble, every ingot being rolled into a perfect billet. The first heat of metal was melted in the cupolas in 50 minutes and was blown in 12 minutes, the steel analyzing as follows: Carbon, 0.08; manganese, 0.39; sulphur, 0.047; phosphorus, 0.099; silicon, 0.009. There was not a hitch anywhere from the time the pig metal was put in the cupola until it was rolled into a billet. Some of the first billets rolled were taken to the skelp mill and rolled into skelp, and the skelp was then taken to the pipe mill, where it was made into pipe, the operation of converting pig metal into finished pipe being done in four hours.

At a recent meeting of the directors of the Passaic Steel Company, Paterson, N. J., a resolution was adopted instructing the secretary to secure an accounting from the promoters of the company regarding the bond issue of $2,500,000. Concerning this resolution, F. F. Searing, formerly vice-president of the Passaic Steel Company, who was one of those connected with the purchase of the property and the formation of the Passaic Steel Company as successor to the Passaic Rolling Mill Company, is quoted as saying that the entire details of the acquisition of the property and the disposition of the funds are on record at the office of the Passaic Steel Company. Of the $2,500,000 of bonds, $2,000,000 went to acquire the stock, plant and business of the Passaic Rolling Mill Company, which was appraised by Haskins & Sells at upward of $2,400,000. The remaining $500,000 of bonds, Mr. Searing states, were sold for cash and the money paid into the company. The directors have called a meeting for September 4 to receive the statement of the promoters and former officers of the company.

The Standard Cast Iron Pipe & Foundry Company has been incorporated with a New Jersey charter. The capital stock is $2,000,000. Joseph S. Keen, Jr., George M. Bunting, H. B. Dodge and Harold P. King of Philadelphia are the incorporators. The company will build what will probably be the largest pipe plant in the country. The location will be in the vicinity of Philadelphia, and has been practically decided upon, but a final decision as to this, as well as the plans for building, the capacity of the plant and other details will be made in about two weeks. Andrew H. McNeal will be prominently connected with the organization, although his official position has not yet been decided upon. Steel pipe making may also be taken up. The promoters of the enterprise are prominently connected with the American Pipe Mfg. Company, Philadelphia, owner of water works in various parts of the country.

The pig iron shortage which has been experienced by the Illinois Steel Company during the past two months, and which has greatly curtailed its steel production, will be materially relieved within the next 30 days by the blowing in of three furnaces with a daily capacity of 1000 tons. At Joliet a new stack, making the fourth in the group, with a rated daily capacity of 450 tons, will be blown in next week, while one stack at the South Works, which is being rebuilt, will be added to the active list the latter part of next month, and one furnace at the Union Works, which is being rebuilt, will be placed in operation in about 10 days. Eighteen of the company's furnaces are now in operation as follows: South Works, 10; Joliet, 3; Milwaukee, 2; North Works, 2; Union Works, 1.

The fourth Cincinnati fall festival opened August 28, and will continue one month. The displays embrace all sorts of manufacturing products and adjuncts. The government has an attractive exhibit. The festival occupies Music Hall, and also all of Washington Park, across the street.

Ore Shipments Below Expectations.

DULUTH, MINN., August 25, 1906.—August is the last of the big months for ore shipments from Lake Superior. With the advent of September the business falls off materially, and the biggest shippers always expect a diminution of at least 20 per cent. from the average of the two or three preceding months. There will be no month in 1906 in which ore shipments will reach the hoped-for total of 6,000,000 tons, which was so freely predicted a short time ago. It is very doubtful if August equals July, when shipments from all ports reached 5,762,000 tons. The leading shipper of the lake region, the Duluth, Missabe & Northern Railroad, will fall about 100,000 tons below its record of 1,801,000 tons in July. This is on account of the delay caused by a few days' break in the interstate bridge between its docks and the open lake, and by the wet weather of the past few days, which has affected all the head of the lake dock systems in common. Since the bridge was opened this road has exceeded all previous records by shipping over its line an average of 100,000 tons per 24 hours for several days, and if weather conditions had continued excellent it would have reached within a few thousand tons of high mark. But stockpiles are about exhausted everywhere, and this cuts into the traffic more and more as the season progresses. It is now conceded by the best posted men in the trade that total shipments for the year will not exceed, say, 35,500,000 gross tons. This is an increase of less than 1,000,000 tons over the season before, when 34,353,000 tons were moved down the lakes.

On first thought this fact is a rather startling one. Is it not possible, with all efforts made to push shipments of lake ore, with the enormous preparations of winter, the increase of dock facilities, of ships, and of receiving room and unloading devices at lower lakes, to make more than a paltry 5 per cent. increase? If so, the sooner the trade realizes the fact the better it will be for all concerned. But the facts are not quite as they look. The universal delay in delivery of material and in filling orders has worked against those building ore docks, ships and cars as well as against every other branch of trade. Docks started last fall have not been completed; cars ordered for May delivery have not arrived in service; ships of a capacity for 6,000,000 tons have been put afloat on the lakes this year, but on account of the late delivery of some of the total addition to the fleet for this year's operations is about two-thirds that amount. Mine equipment ordered in ample time was not received soon enough to permit the full use of mines this year; and above and beyond all is the shortage of mine labor over all the Lake Superior region, which has been far more serious than has been generally understood by the public.

The demand for ore and the slight improvement in shipments over 1905 will have a tendency to push equipment orders for next year, and by so much to continue the buying of material on a large scale. Many new mines must be opened for the coming spring; many large orders for stripping shovels, locomotives and other equipment, both for surface and underground, must be given. There must be more improvements to lower lake receiving docks, in addition to the two or three that have come in this season. Two of the roads, and those two are the largest shippers, are in the market now for 2500 50-ton steel cars, and will probably place their orders within a week. They are also after about 20 road locomotives of large size and great power. There may be a new ore shipping pier or two. The new pier of the Duluth, Missabe & Northern Railroad will be ready for partial use in about two weeks. It will be of even a larger shipping capacity than expected, on account of its great hight and the ease of moving ore through it. D. E. W.

A census bulletin just completed for 1904 shows that the number of manufacturing establishments in the country is 216,262, an increase of 4 per cent. over 1900. Capital increased during the five years from $8,978,825,200 to $12,686,265,673, or 41 per cent. In the same period the total value of products increased from $11,411,121,122 to $14,802,147,087, a gain of 30 per cent. The number of wage earners increased 16 per cent. and the wages 30 per cent.

The Central Foundry Company.

The annual meeting of the stockholders of the Central Foundry Company was held August 24 in Jersey City. The report of the financial condition of the company at the close of its fiscal year, June 30, 1906, was submitted. It compares as follows with the two preceding years:

	1906.	1905.	1904.
Net earnings	$493,769	$511,423	$467,504
Bond interest	231,780	231,780	231,780
Universal pipe plant, &c.	36,095	42,705	.....
Balance	$225,893	$236,938	$235,724
Depreciation account	225,893	236,938	235,724

The general balance sheet, as of June 30, compares as follows:

Assets.

	1906.	1905.	1904.
Plant inventory	$14,962,482	$15,097,574	$15,345,381
Treasury stock	700,000	700,000	700,000
Stock in subsidiary companies	1,200,000	1,200,000	1,100,000
Notes received from subsidiary companies	.....	.....	117,908
Accounts and bills receivable	574,505	501,572	408,022
Inventory	631,208	523,320	426,218
Cash	65,543	59,989	63,446
Unexpired insurance and taxes	3,866	2,012	3,026
Furniture and fixtures	4,771	4,771	4,771
Totals	$18,142,376	$18,089,239	$18,168,773

Liabilities.

	1906.	1905.	1904.
Capital stock	$14,000,000	$14,000,000	$14,000,000
Debenture bonds	3,863,000	3,863,000	3,863,000
Accrued interest	38,630	38,630	38,630
Accounts and bills payable	240,747	187,609	267,143
Totals	$18,142,377	$18,089,239	$18,168,773

President Alfred Fowle, Jr., made an interesting report on the company's operations during the year, from which the following extracts are taken:

The volume of the company's business in soil pipe and fittings, sinks, service boxes, &c., was somewhat less than the year previous owing to many new competitors in the field and scarcity of labor at all plants restricting production. The total production, however, of soil pipe and fittings, Universal pipe and F. & W. fittings was within 140 tons of the previous year. The sales of Universal pipe and fittings for gas and water mains and for other purposes have been largely increased, but the production and necessarily the sales (as the company has been able to sell all that it could produce) have been largely restricted owing to the same difficult labor conditions existing in this department as in the regular line. The progress made in this department, however, has been encouraging to the directors, as the difficulties incidental to starting and making a class of goods requiring such mechanical precision have been largely overcome, and the company is now producing a much better quality of goods at a lower rate of cost than in the past. It has largely added to the producing capacity in this line by an additional plant, which is run in connection with the regular Newark plant for soil pipe and fittings, which it has taken some nine months to complete, but which is now in as full operation as labor conditions will permit, and it is hoped within a very short time to bring the plant up to its full capacity of about 10,000 tons per annum. The demand for this class of goods is beyond the added producing capacity, but owing to the lack of available funds to further increase it, the company cannot anticipate a production much in excess of 25,000 tons per annum for the ensuing year unless additional capital can be secured in the near future to erect additional plants.

The Central Iron & Coal Company's earnings for the year ending June 30, 1906, were $70,333.82, less depreciation $29,514.27, leaving a net profit of $40,819.55, which is carried forward to surplus account. This company was formed March 12, 1901, with a capital stock of $750,000, which was subsequently increased to $1,000,000, all owned by the Central Foundry Company and paid for in cash at par out of its earnings, and acquired 4060 acres of coal land, containing, from the best estimate of competent engineers, 38,000,000 tons of high grade coal. It also acquired three different brown ore properties, containing altogether 2288 acres. A conservative estimate of the brown ore contained in the different properties is surely in excess of 5,000,000 tons. It also acquired a red ore mine, partially developed, at Birmingham, which contains a seam of ore 20 feet thick, of which the upper 10 feet, now being mined, is of high grade, averaging about 40 per cent. in metallic iron, and contains 3,500,000 tons.

The Central Radiator Company was formed February 26, 1903, and has a capital stock of $200,000 all paid for in cash by the Central Foundry Company out of its earnings, with the exception of $35,000, which represents the transfer of real estate, buildings, machinery, &c., from the foundry company to the radiator company. The company was formed when radiation was selling at 25 per cent. higher than it has sold since the plant commenced producing, and notwithstanding the great expense of changing the equipment to meet the changed demand since the equipment was first built, most of which has been charged to the cost of production, has earned for the year ending June 30, 1906, $9,601.62, less depreciation of buildings and machinery, $4,373.46, leaving a net profit of $5,228.16, which is carried as a surplus account.

The report concludes as follows:

"Your officers and board of directors shortly after the formation of the company, realizing that in the manufacture of soil pipe and fittings and what few miscellaneous goods the company acquired the equipment for, from the 32 plants purchased, could not possibly meet, under open competition, its fixed charges, saw the necessity of getting into different lines closely allied to our own to bring the volume of business in diversified lines up to a much higher tonnage; and they have earnestly endeavored and hoped the outside lines that we have entered into could be brought up to a sufficient volume showing a profit so that it might be independent of the profits arising from the sale of soil pipe and fittings, which is so easy for any one to start in the manufacture of, and which require very little mechanical skill, and but a small investment to manufacture sufficient to disturb the market. Your profits, as shown above, have been largely made up by the manufacture and sale of soil pipe and fittings. This profit, however, is due in large measure to the active demand, which has enabled your officers to obtain profitable prices, and has resulted, as they knew it would, in a large amount of new competition, the number outside of the Central Foundry Company now engaged in that line being in excess of the whole number in the line when this company was formed.

"While we have made progress and considerable profit in the manufacture of Universal pipe and fittings and F. & W. fittings, both of which the company absolutely controls, the lack of sufficient capital has kept our progress down so that the earnings in these departments do not nearly approximate your fixed charges and expenses. The producing capacity of soil pipe and fittings under the normal labor conditions is now over double the possible consumption during prosperous years, and is much in excess of that when building operations throughout the entire country are less active than at present. Your company greatly increased its assets by acquiring the valuable properties you own in the South, and with sufficient capital to further develop them and largely increase the production of Universal pipe and fittings and F. & W. fittings, with careful, economical and intelligent management, should, during times less prosperous than the present, not only earn its fixed charges, but a large amount in excess thereof."

At the annual meeting four new directors, representing the minority interests, were elected, these being S. Watts Bowker and A. Klamroth, representing Waterman, Anthony & Co., and George Leask & Co., respectively, and Charles R. Schmidt of Baltimore, and Henry E. Bullock of Chicago. The retiring directors were Winthrop L. Rogers, Albert L. Sweet, H. H. Spence and Joseph Lodge. It is understood that Messrs. Bowker and Klamroth will act temporarily, and then give place to Mr. Clemons of Waterman, Anthony & Co., and Mr. Leask of George Leask & Co.

Trade Publications.

Power Presses.—Cady Machine Company, 1227 Euclid avenue, Cleveland, Ohio. Circular. Deals with an improved line of power presses mentioned in *The Iron Age* August 16, 1906. The range of work for which they are adapted covers nearly every kind of blank cutting, punching, perforating, forming and bending. Reference is also made to a four-slide wire forming machine and bar iron cutters.

Heavy Milling Machines.—The Ingersoll Milling Machine Co., Rockford, Ill. Catalogue 15. Size 6 x 9 in.; pages 66. Deals with the line of heavy milling machines that forms this company's exclusive product. Horizontal spindle milling machines with a removable outboard housing are shown in sizes of from 20 x 20 in. to 36 x 36 in. Heavy type horizontal spindle milling machines are made in sizes up to 72 in. Horizontal spindle machines are also furnished with vertical spindle attachments, and with extended cross rails. These machines, equipped with swinging vertical attachments, afford an opportunity of executing a wide variety of angular work. An extensive line of vertical spindle milling machines are also shown, including those with one or two spindles, and with open side arrangements. Another line shows duplex horizontal milling machines with plain and swiveling heads. Combined machines with two horizontal and two vertical heads represent the maximum of versatility. The largest machine shown is a 10-ft. four-head milling machine, the shipping weight of which is over 300,000 lb. The latter part of the book deals with cutters and mills and cutter grinders, and also shows a few arrangements of motor drive. Three accompanying circulars show respectively the flexibility of an Ingersoll milling machine, new type heavy horizontal milling machines, and a few random examples of work done on the Ingersoll milling machine.

Machinery.—Marshall & Huschart Machinery Company, 62 South Canal street, Chicago. Loose leaves for catalogue insertion, some of them superseding previous pages of the same numbers. No. 39-C shows an Allen high speed ball bearing drill. The following show Bullard products. No. 61, a 30-in. standard boring and turning mill, with swivel turret head; 61-B, a 36-in. rapid production vertical turret lathe with one swivel turret head and one fixed side head; 62, a 42-in. standard boring and turning mill with two swivel heads; 63, the same with one fixed turret head and one swivel head; 63-A, a 42-in. rapid production boring and turning mill with one fixed turret head and one swivel head; 63-B, the same with two swivel heads; 64, a 51-in. standard boring and turning mill with two swivel heads; 64-A, a 54-in. rapid production boring and turning mill with two swivel heads; 65, a 60-in. standard boring and turning mill with two swivel heads; 66, the same in 62-in. size; 67, the same in 76-in. size; 68, the same in 86-in. size; 69, a 120-in. rapid production boring and turning mill with two swivel heads; 70, three types of motor drive for boring mills; 71 and 72, chuck jaws for boring and turning mills; No. 90-A shows a Rockford 16-in. crank shaper.

Carpenters' Supplies.—W. C. Toles Company, Irving Park, Chicago, Ill. Catalogue. Shows a line of rapid acting vises for wood workers, and a line of manual training benches.

Locomotive Cranes, Buckets and Tubs.—Wellman-Seaver-Morgan Company, Cleveland, Ohio. Pamphlet. Contains illustrations suggesting a few of the many kinds of work in which locomotive cranes may be used advantageously. Specifications of the company's 10-ton locomotive crane, models A and B, are given, and a table of their lifting capacities at various radii of action. The Hulett patent standard gauge locomotive crane and Hulett excavating bucket are also described.

Belt Conveyors.—Robins Conveying Belt Company, Park Row Building, New York. Bulletin No. 14. By a large number of illustrations and considerable text it shows the use of Robins belt conveyors in the handling of excavated earth and rock and concrete material. An accompanying dimension sheet gives the dimensions of troughing and bottom idlers for belt conveyors.

Kerosene Engines.—International Power Vehicle Company, Stamford, Conn. Catalogue. Describes the general construction of International kerosene oil engines, and illustrates the 1½, 3 and 10 hp. sizes. A reversing gear for launches, a kerosene engine for marine purposes, mounted in connection with a reversing clutch and complete equipment, are also shown and described. The last few pages show the use of kerosene engines for the driving of pumping jacks, electric generators and portable hoists.

Steam Engines.—Providence Engineering Works, Providence, R. I. Catalogue. Size 9 x 12 in.; pages 15, with five full page inserted half-tone engravings. Devoted to the Rice & Sargent engine. A general exposition of the type of engine it aims to be and the points of difference between it and other engines is followed by a description of the regular pattern covering the parts in detail. After this the provisions which are made as extras are described, their purpose being to meet special requirements. An accompanying pamphlet gives the report of a test on a compound Rice & Sargent engine using highly superheated steam, and another circular gives the report of an inspection and test of a 14 x 28 x 48 in. horizontal tandem compound engine. A third circular deals with the partial load steam economies of a Rice & Sargent engine.

Petroleum Lubricating Oils.—A. W. Harris Oil Company, Providence, R. I. Pamphlet. This is a peculiarly useful booklet for the consumer of oils, in that it sets forth the different grades of oil the company produces, explaining in connection with each the particular service for which it is especially adapted. The oils included are valve and cylinder oils; engine, turbine and other machine oils; drill, automobile and other special oils; boiler compound, cable coating, belt dressing, floor oils, &c.

Foundry Supplies.—Frederic B. Stevens, Larned and Third streets, Detroit, Mich. Catalogue No. 6. Size 6 x 9 in.; pages 224. Foundry facings, foundry supplies and polishers' and platers' supplies are the general classifications of the subject matter, but to list them in detail would be entirely out of the question. Practically every conceivable article which would come under these headings is to be found within the pages, and a very complete index is appended for readily locating any specific article.

Boilers.—Coatesville Boiler Works, Coatesville, Pa. Pamphlet. Refers briefly to the Coatesville return tubular boilers and other heavy plate metal work done by the company. A list of boiler plants equipped with these boilers, and self-supporting stacks built by the company, is given, together with a number of references grouped by cities and States.

Foundry Chaplets and Anchors.—W. W. Lindsay & Co., Harrison Building, Philadelphia, Pa. Catalogue No. 2. Lists the various standard Lindsay chaplets carried in stock as well as numerous special chaplets to meet the requirements of work of a special character. The advantages of the Lindsay chaplet, and their method of manufacture are described.

Hand Book of Standards.—National Tube Company, Pittsburgh, Pa. Four revised pages. Since the hand book was issued in 1902 the company has made some changes in the dimensions of couplings, described on pages 15, 16, 17 and 18. Four gummed sheets containing the revised dimensions of the couplings are now being distributed to be pasted over the superseded pages.

Magnesia Covering.—Philip Carey Mfg. Company, Lockland, Cincinnati, Ohio. Pamphlet. Size 6 x 9 in.; pages 45. Contains a brief treatment on the subject of heat insulation and magnesia coverings, and shows a number of views of prominent buildings and plants throughout the country where the company's magnesia steam pipe and boiler coverings are used. Price-lists are given of 85 per cent. magnesia sectional coverings, for steam pipes and fittings, and 85 per cent. magnesia sectional blocks, for covering boilers and similar surfaces. A partial list of users is appended. A second catalogue from the same company, size 4¾ x 6½ in., of 48 pages, is a more complete catalogue on the subject of "Carey's Coverings," and is fully indexed. The claims for Carey's coverings are set forth at the beginning, and a brief statement of the forms of coverings made is given. The remaining pages contain price-lists, and illustrates the various forms of coverings, explaining in connection with each the properties and utilities. In addition to the magnesia and asbestos pipe coverings and laggings there are mentioned magnesia cement, asbestos cement felting, mineral wool and air chamber coverings, as well as furnace cement, retort cement, furnace pipe coverings, asbestos rope packing, wick packing, asbestos sheet millboard, asbestos air cell fireboard, &c.

Refrigerating Machinery.—Remington Machine Company, Wilmington, Del. Catalogue. Size 4¾ x 7¾ in.; pages 83. Describes and illustrates the company's general line of ice making and refrigerating machinery, and contains a considerable amount of useful information in connection with the method employed, explaining it so that those unfamiliar with this class of apparatus may be better informed as to the machinery and system best suited to their requirements. The most recent additions to the company's line of machinery, which are described, are the BR and BRB portable ice machines. Another part of the catalogue sets forth the advantages of a convenient water cooling plant for furnishing cool drinking water in office and other large buildings, this system being especially desirable because of its economy and the purity of the water supply.

Emery Grinders.—Challenge Machine Company, Philadelphia, Pa. Bulletins and loose leaf binder. Bulletin No. 1-A deals with Challenge emery grinder head, type 1, showing it as applied to column types 6, 7 and 133, intended, respectively, for overhead, contained countershaft and contained motor drive. No. 2-A describes and illustrates the type 8 head, showing it in connection with the same columns. Nos. 3-A, 4-A, 5-A, 6-A and 7-A, respectively, similarly deal with the following heads, types 9, 10, 12, 14 and 86. The intended uses of the heads are as follows: Type 1, for plain dry grinding; type 8, for surface and plain dry grinding combined; type 9, for plain dry grinding and edge or surface grinding combined; type 10, for plain dry and wet tool grinding; type 12, for two wet tool grinders; type 14, for one wet tool grinder and a surface grinder, and type 86, for use as a bench machine or for polishing. Bulletin 8-A shows the type 70 emery grinder designed for heavy grinding. No. 9-A shows the type 104 grinder, being a bench machine for light dry grinding. No. 10-A shows Challenge countershafts. A price-list is included with the bulletins.

The Machinery Trade.

NEW YORK, August 29, 1906.

A large project developed the past week, the machinery equipment for the carrying out of which will entail the expenditure of a great deal of money. Aside from this the inquiries and orders were for small amounts, though many of them came from such important companies as the American Locomotive and Middletown Car companies. Reports from the West state that the Atchison, Topeka & Santa Fé and Illinois Central railroads have placed large orders against the lists they issued some time ago. In this territory the railroads have done but little in the way of making purchases, but it is thought that as soon as the officials return from their vacations the lists now before the trade will be closed.

Although manufacturers of engines and boilers have met with an unprecedented summer's business they have managed to catch up with the trade somewhat, and are offering rather better terms for delivery than those in other classes in the machinery trade. While there are some manufacturers who can hold out no hope for delivery under a year, there are some, especially in the small engine line, who can make deliveries in three to five months. The majority of manufacturers of large engines demand a much longer time, however, for filling orders. It is interesting to note in this connection that some purchasers have of late been offering unprecedented prices for new machine tools, provided early deliveries can be made, and several instances have been recorded where manufacturers have offered bonuses on quick deliveries, which have been graduated according to the time taken in fulfilling orders. As an indication of the trouble that will come to some of the railroad purchasing agents in filling their lists of requirements now before the trade the experience of a Western railroad buyer is interesting. The company was obliged to equip a blacksmith department in a hurry, in order to take care of the repairs on an important section of the road, and after canvassing the country for machinery suitable to its needs, in an attempt to equip the shop within a period of four months, the idea of fitting it with new machinery was given up and the company put in a lot of makeshift equipment, much of which was gathered from its own shops at other points, although it could hardly be spared from those shops.

Machinery Requirements for Wire Mill.

The most important announcement in the trade this week is that W. W. Gibbs, 150 Nassau street, New York, is now ready to buy machinery for the large wire mill to be erected at Buffalo, N. Y., by the Shenandoah Steel Wire Company. An idea as to the amount of the machinery that will be purchased can be gained from the statement that the buildings will cover 3 acres of ground, and as it is the intention to get the plant in operation at the earliest possible time purchases will be made at once, and machines will undoubtedly be selected that can be delivered at an early date. One of the important features of this mill will be its operation, which will be by electricity, each machine to be operated by an independent motor. As a large number of wire drawing machines will be installed a great many motors will be required, some of them of large horsepower. In addition to the wire drawing machines, almost all kinds of machinery that go into a wire mill will be required. The machinery which Mr. Gibbs is now ready to purchase includes principally machine tools and woodworking machinery for the repair shops that will be erected in connection with the plant, electric traveling cranes, galvanizing plant, tinning plant, boilers, annealing furnaces, heating and ventilating apparatus, shafting and pulleys, and a large amount of other material. This project is so extensive that purchases are likely to continue for some time to come, and will cover various classes of mechanical equipment.

Machinery houses are keeping in close touch with the Savage Arms Company, Utica, N. Y., which is making important improvements to its plant, and contemplating further extensions in the near future. In the production of its goods the company uses a large quantity of metal working machinery, and from its proposed large increase of capacity it is probable that a large amount of machine tools will be purchased. Inquiry in the trade reveals the fact that the company has not yet purchased the equipment for its new buildings. The additions to its plant now in course of construction will give the company about 20,000 additional square feet of floor space, which will be occupied by machinery and other equipment for the manufacture of rifles of its present models and to take care of the new inventions which the company expects to place on the market shortly. Other buildings are under consideration, and it is probable that plans for further building operations will be prepared very soon. The company's present facilities have been inadequate to take care of its business this year, and for several months it has been unable to accept new business on many of its present models.

The Singer Sewing Machine Company, with main offices at 149 Broadway, New York, has about completed the large addition to its plant at Elizabeth, N. J., and it is understood that some orders have been placed by the company in the New York market during the last few weeks for equipping the addition. The company, which has the largest manufacturing plant in Elizabeth and the largest sewing machine manufactory in the world, has added a building about 200 x 400 ft. and five stories in hight, and it is thought in the trade that all of the machinery equipment has not been purchased as yet. It is understood that it is the company's intention to equip the building as soon as possible and that will necessarily entail a large expenditure, especially for such tools as milling machines and other fine machine tools.

The American Locomotive Company has a number of inquiries in the market for machinery equipment for its plants at Schenectady, N. Y., and at Providence, R. I. At the latter place the company has been erecting a large plant for the American Automobile Company, one of the subsidiary interests which was organized last year to operate the company's automobile business. While a large part of the machinery equipment for the automobile plant has been purchased and manufacturing operations are already on there, it is understood that there is quite a little machinery needed to make the plant complete. This company has been one of the largest buyers in the New York market during the summer, and the indications are that all of its proposed additions have not yet been provided for. Plans are now under way for a general addition to the Canadian plant, and it is understood that the machinery for that has not been secured.

Quite a little new machinery will be required by the new company, which was recently organized by H. R. Romberger and others, Winona, Miss., and which will erect a plant on the Southern Railroad tracks for general machine repairs and manufacturing. The first building to be erected will be about 50 x 60 ft., with a foundry, 40 x 50 ft.

Bids for machinery equipment are now being received by the Dion Mfg. Company, Wilkes-Barre, Pa., which is erecting a plant for drawing and pressing steel, making drop forgings and for the manufacture of enameled ware. The plant will consist of two main buildings, one 40 x 120 ft., another 40 x 100 ft., two stories, of reinforced concrete. A power plant will also be installed.

The Pressure Castings Company has been organized with offices at 17 Battery place, New York, and is now getting equipment for a brass foundry to be located somewhere uptown. The company purposes going into the general jobbing business in manufacturing intricate brass castings of any design by a new process, on which patents were recently applied for. Although the company will start out in a small way, it expects later on to extend. Its officers state that its method of manufacturing has satisfactorily passed the experimental stage, and a large number of orders have already been booked. The company is organized with an authorized capital of $10,000, and the incorporators are C. G. Armstrong, O. E. Goldschmidt and A. L. McEulaine of New York. Mr. Armstrong is a consulting engineer.

Plans are being prepared by the engineering firm of J. G. White & Co., 49 Exchange place, New York, for railroad car shops, to be built in connection with the construction of a system of railroads covering the islands of Panay, Negros and Cebu, in the Philippines. The engineering firm will equip three complete car plants, one on each island, and perhaps other smaller plants at points along the various lines. So far the car shops have been arranged for only in a preliminary way, and no machinery has been purchased, nor is it expected that that feature will be gone into for some time. As has been stated in these columns, the roads are to be built by private American capital under concessions granted by the Insular Government, and it is expected that the work will involve an expenditure of $30,000,000 or more. So far surveys have been nearly completed, and it will not be long before the actual work of construction will commence. It is expected that by the end of the year the plans will be completed for the repair plants, and the construction of each of the plants will include machine shops, blacksmith shops, car construction departments and everything that goes to make up a good general repair station. It is understood that the operations on Panay will be begun first, as that is the most important of the three islands, and it is expected that the largest of the three plants will be built at Iloilo, where the company has large harbor improvement work under way. One of the largest engineering corps ever sent out for an enterprise of the kind is now in the Philippines laying out the work for the proposed road, and the company has established a department at its New York office devoted exclusively to the handling of its Philippine work, which, in addition to the railroad operations, includes large harbor improvements in Cebu and a coaling station at Olongapo, Subig Bay. The coaling station will consist of six coaling units practically in duplicate, and elaborate coal handling apparatus capable of taking care of 400 tons an hour. It is estimated that each unit will cost $500,000. While the company maintains an extensive construction plant on the island, now being used chiefly on the harbor improvements, it

is expected that there is much to be bought in the way of construction equipment, and it is more than probable that most of the buying will be done through the New York office. The railroads will aggregate about 400 miles of track, almost equally divided among the three islands. It may be that the present scarcity of machine tools will prompt those in charge of the work to order the equipment for the proposed repair plants sooner than ordinarily, but in the regular course of events the trade might expect to hear about the company's requirements some time during the coming winter. J. G. White & Co. have been placing some orders for railroad equipment of late, which it is thought is for the high grade interurban trolley line which the company has the contract to construct between Rochester and Lockport, N. Y. This line is being built by interests closely connected with the Ontario Power Company, and J. G. White & Co. have a contract to build five substations, besides large repair shops and car barns, and will supply all the rolling stock, while the Ontario Power Company will supply the power.

Philadelphia Machinery Market.

PHILADELPHIA, PA., August 28, 1906.

Such business as has been closed during the past week has consisted mainly of orders for single tools. Here and there an order covering two or more tools has been taken, but the number was small. A few additional orders have been received from the various railroads, particularly from the Pennsylvania, which is still sending out orders against its annual tool list, as well as some few inquiries for additional equipment not on that list. The Baldwin Locomotive Works has placed orders for several steam hammers and is buying additional equipment from time to time. This company may be said to be in the market practically all the time for tools and machinery of various kinds, but seldom presents any regular list of its requirements to the trade in general.

Manufacturers of all classes of machinery and tools continue fully occupied, plants being taxed to their utmost to get out as large a production as possible. Notwithstanding this, the output has in the majority of cases not kept pace with the demand, and deliveries on many classes and sizes of tools are becoming more extended rather than improving. This condition also interferes to a material extent with the placing of new business, and a considerable amount has been held up on this account, the purchaser not being satisfied to wait from six to nine months, and in some individual cases almost a year, for deliveries, in which time it is argued that the conditions as far as his individual business are concerned might be changed. In such cases the second hand machinery market is frequently sought for such tools as may be had for more prompt delivery, but even this field has its limititations and dealers are now finding it difficult to supply the demand for desirable sizes in many classes of machinery.

While there is some little improvement in the foreign demand, the manufacturers of the general line of tools do not take a great deal of interest in this branch of the business. Orders for the domestic trade are claiming the greater portion of their efforts, and while such conditions exist but little attention is likely to be given the foreign demand. In special tools and machinery more business is being booked, while manufacturers who have a more or less established trade in the various machinery and power transmission specialties are taking on, if anything, a somewhat larger volume of business. Boilers and engines, both new and second hand, have been in fair demand, but the same difficulties in closing business under consideration is experienced in this as well as the general machinery trades.

Iron and steel foundries continue very active, and a large amount of new work is being offered. In some lines there is considerable difficulty in getting prompt deliveries, particularly in steel castings and the better grades of gray iron work. Foundries are as a rule being operated to their full capacities, and a heavy tonnage of castings is being produced.

Samuel J. Shimer & Sons, Milton, Pa., have had plans prepared and will shortly begin the erection of a new machine shop. The building will be of reinforced concrete construction, 75 x 141 ft., two stories high. The first floor will be used as a machine shop, while the second floor will serve as an office and storage room for records, &c. New machinery has already been ordered, which, together with their present excellent equipment, will give a largely increased capacity to the plant.

The engineers of the Philadelphia & Reading Railroad and of the city of Philadelphia have finally agreed on the general plans for the construction of the elevated railroad to be built by the former company. All the legislative, legal and financial questions incident to the abolishment of the grade crossings of several of the branches of the railroad have been settled, and the agreement recently reached will now permit of the preparation of working plans for the erection of the elevated structures. This work will be pushed forward rapidly, and it is expected that actual work will be started within the year.

Plans are being prepared, it is understood, for a large new power house, to be erected at Chestertown, Md., which will be used to furnish power for an electric railroad to be built beteen Charleston and Tolchester, Md., as well as furnish power for electric lights and general purposes. D. C. Baxter & Co. are said to be the engineers in charge.

The A. M. Collins Mfg. Company has had plans prepared and invited estimates for a 120 x 260 ft. addition to its plant at American and Columbia avenues. The building is to be of brick, six stories, and will be equipped with all modern appointments. The addition will be used for an extension to the company's box making plant, and will be equipped with a considerable quantity of machinery specially adapted to that manufacture.

I. H. Johnson, Jr., & Co., Incorporated, have recently taken quite a large number of orders for lathes of various sizes and are very busy in all departments. Inquiries continue plentiful, and the outlook for business during the fall months is considered very satisfactory. Several carloads of medium sized tools have recently been shipped to purchasers in the New England States, while shipments to parties in the Middle West and the Pacific Coast are also to be noted. One of the lathes shipped during the past week was of extra large size, electrically driven, and weighed 70,000 lb. complete.

H. B. Underwood & Co. are busy in all departments. The demand for portable shop repair tools has been good, and that for general machine repair work has been more active than ever. Orders for several portable tools have been taken for export shipment, and one 26-in. rotary planing machine and a locomotive boring bar have been shipped to foreign account. A 6 and a 4 in. portable boring bar have been furnished to railroad companies, a 2½-in. bar has been sold to the United States Government, and 36 and 28 in. portable valve seat rotary planing machines, boring bars for lathe work and other special tools have been shipped to railroad shops, as well as industrial concerns.

Chicago Machinery Market.

CHICAGO, ILL., August 28, 1906.

The awarding of contracts for the Illinois Central Railroad on the special budget of requirements for extensive additions that are under way at its Burnside car and repair shops is by far the most important development in the machinery trade of the week. The complete list of tools specified appeared in the August 6 issue of *The Iron Age*. Inasmuch as the list was promulgated some time ago and the closing of contracts delayed, it was generally believed by dealers and manufacturers that on account of the deferred deliveries and the higher prices now prevailing that action would not be taken until later in the year. The general industrial activity, however, that has already resulted in the placing of heavy contracts with machine tool builders for delivery early in 1907, no doubt hastened the closing of bids by this company, and on much of the machinery already purchased deliveries will not be made until early next year. The Atchison, Topeka & Santa Fé Railroad has likewise closed for its requirements, and other roads that have deferred, it is believed, will close at an early date.

The Green Engineering Company, Chicago, is erecting a new plant at Indiana Harbor, Ind., at a cost of $100,000, for the manufacture of its chain grate stokers, and the entire equipment, including machine tools, cranes, &c., will be purchased in the near future.

The Indiana Steel Company will shortly ask for prices on the crane equipment for the new rail mill, which has already been awarded to the United Engineering & Foundry Company. The purchase of the crane equipment has been delayed, as the plans for these buildings have not yet been completed.

The Atchison, Topeka & Santa Fé Railroad is adding to its shop facilities at Topeka, Kan., contracts having just been let for the buildings, which will cost alone approximately $275,000. The cost of the land which has been purchased and the cost of the equipment which will go into the new shops will bring the total expenditure close to $600,000. The largest of all the buildings planned will be a freight car repair shed. It will be 206½ ft. wide and 900 ft. long. Another building of the group will be a shop for the construction of steel freight cars, 80 x 200 ft. A dry kiln, 50 x 60 ft., will also be erected for the purpose of drying green lumber before it is worked up for use in car construction. Directly east of the dry kiln will be a planing mill, 76 x 150 ft., and extending north from this building will be the engine and boiler rooms, the former 36 x 50 ft. and the latter 44 x 50 ft. The equipment for these buildings has not yet been considered, and it may be some time before specifications will be issued. The list will include about $25,000

worth of tools and equipment for the boiler and engine plant. Details of the work are in the hands of the chief engineer at Topeka. Contracts have been let by this road on the list of tools and machines issued some time ago for use in various line shops. Orders were widely distributed among manufacturers and dealers.

The Heath & Milligan Mfg. Company, Chicago, is having plans prepared for a new paint and color plant to replace the one destroyed by fire last month. The company owns a 4-acre site at the northeast corner of Lumber and Canal streets, extending to Seward street. Although plans are still in a preliminary state, it is expected that two factory buildings, 100 x 200 ft. each and four stories high, will be erected, together with a power house. An inspection has been made of some of the principal paint producing plants in the country, with a view to embodying the latest features in this plant. As the entire plant was destroyed by fire, entirely new equipment will be required, including power house units. The plant is to be electrically operated, and the power house will furnish from 800 to 1000 hp.

The Peoria Gas & Electric Company, Peoria, Ill., will make considerable improvements to its plant. Two 540-hp. boilers of the Geary type, built by the Oil City Boiler Company, Oil City, Pa., have already been purchased. They are equipped with chain grates manufactured by the Green Engineering Company, Chicago. A new intake is being built to the river at a cost of $3000. A Worthington pump has been purchased and two old batteries of boilers have been equipped with Green chain grates, and a 1000-kw. Curtis turbine generator installed. Contract for a 200-ft. stack, 13 ft. inside diameter, has been let to the Weber Company of Chicago. It is the intention of the company to install about 1000 hp. additional boilers next spring, and to equip the plant with a complete system of coal and ash handling devices, including storage bunkers.

Extensive changes and additions will be made within the next two years by the Tri-City Railway & Light Company, with headquarters at Davenport, Iowa. The improvements will affect all the properties controlled by the company, which involve gas and electric light plants and electric railway lines serving the three cities of Moline and Rock Island, Ill., and Davenport, Iowa. J. G. White & Co., New York, are the consulting and supervising engineers and are attending to the purchases of equipment.

Bids will be received by the Sanitary District of Chicago on October 3 for furnishing electrical apparatus and material for a substation to be located on Western avenue, south of the main drainage canal. Included in a large amount of electrical equipment will be two motor driven centrifugal pumps, two motor generator units of 20 kw. capacity each and a 15-ton electrical traveling crane.

Cincinnati Machinery Market.

CINCINNATI, OHIO, August 28, 1906.

Manufacturers report a substantial gain in new business the past week. A majority of manufacturers of this city apparently took advantage of the low prices in pig iron some months since and are now reaping the benefits in their several lines.

Reference has several times been made in these columns to the Factory Colony Company at Oakley, a close suburb. Since the organization of this company and the allotment of certain tracts to the original investors it has received repeated inquiries from other manufacturing concerns desiring to better their location, where terminal facilities were of the best and larger quarters could be obtained. For some time past the Peck-Williamson Heating & Ventilating Company has had in contemplation the consolidation of its foundry and factory buildings, the former of which is now located at Wellston, Ohio, and the latter in this city. Should it ultimately decide to locate on this site it will probably mean the expenditure of about $50,000 in the way of modern buildings.

Plans for a new water works and power house building for the new suburb of Beechwood have been completed, and as soon as a sufficient water supply is obtained from wells that are now being driven the work of construction will begin. The building will be 56 x 108 ft., entailing a cost of about $60,000. A complete electric light outfit and water works plant are required. Robert Gilmore is the architect and can furnish full details.

The Lunkenheimer Company has secured a building permit for a one, two and three story brick and steel machine shop addition to its plant in this city. The frontage will be about 45 ft., and cost approximately $15,000.

The Ralston Company, Columbus, Ohio, is making extensive improvements to its already large plant. Additions are being erected to the sides of the present main building, which will also be extended 300 ft. This will about double the capacity of the plant as it now exists.

There is a plan on foot to reorganize the Springfield Malleable Iron Company, Springfield, Ohio, which went into the hands of a receiver some months since.

The Case Mfg. Company, Columbus, Ohio, has about decided to let contracts for an 80-ft. addition to its plant on Curtis avenue. The company has been working under great difficulties for some time past, as business has increased to such an extent that larger quarters were imperative.

The Hayden-Corbett Chain Company, Columbus, Ohio, has let contracts for additions that will practially double the capacity of the plant. These buildings will be 50 x 100 ft., and equipped with additional machinery. Work will be started at once.

A number of capitalists of Jackson and Portsmouth, Ohio, have organized the Jackson Iron & Steel Company, and will build a new furnace of 75 tons capacity near Jackson. H. H. Hossman of Portsmouth will be manager of the new industry. The company will begin work immediately on the site selected. The construction of the new plant of the Victor Foundry & Mfg. Company, at Hamilton, Ohio, is progressing satisfactorily, excepting for slight labor difficulties, which have about been settled. The building will be of pressed brick, 80 x 200 ft., equipped with the latest and most improved machinery. The company will manufacture gray iron castings exclusively, and has orders booked for some time ahead. It expects to make the first melt by October.

New England Machinery Market.

WORCESTER, MASS., August 28, 1906.

It is practically decided that the lathe builders will announce an advance of 5 per cent. in their prices in the near future. The matter has been given careful consideration by those manufacturers of this line of machine tools who are members of the National Machine Tool Builders' Association, and it is understood that an agreement has been reached which will result in an early announcement to the trade. It is felt that the market certainly warrants higher prices, not only for lathes, but in all classes of machine tools; but as yet lathes and milling machines (the advance of 5 per cent. on the latter having already been made) are the only lines in which an agreement has been reached, and in fact, in which an agreement has been seriously attempted.

It is quite probable that all regular lines of tools will be put up 5 per cent. before the National Association holds its meetings in October. There may be exceptions, where disagreement may exist as to the advisability of the change, yet this seems rather unlikely in the face of a demand which has continued without interruption throughout a summer, especially a summer which has been exceedingly disagreeable and conducive to lethargy and vacations—a demand which promises to grow even greater as the autumn rush begins.

The matter of costs also enters into increased prices. Since the last advance following the Atlantic City convention of the National Association in May the price of skilled labor has continued to advance, gradually but in the aggregate, materially. Cost systems show this to be the case, that the labor on a machine tool is a bigger item than it was. An advance in the price of castings is expected, for the foundrymen assert that the higher price of pig iron will compel them to raise prices ¼ cent a pound before a great while. So it may be seen that not all of the 5 per cent. advance would be additional profit.

Taken as a whole, the opposition to higher prices which developed in the machine tool trade in the spring, on the part of some dealers and a few manufacturers, has diminished. Little talk is heard on that side of the argument of prices. The prolonged wonderful business has surprised these people, and they see that the future promises to be prolific of heavy orders resulting from a demand which has no precedent. Consequently there should be few to oppose higher prices which every one believes will not affect the volume of business even a little, and which cannot be justly criticised by customers who are themselves getting the best possible prices for their products.

Almost all estimate work has been advanced by the machine shops. The increase has been rather ruthlessly accomplished, amounting to a considerable percentage in many instances. In the manufacture of special tools, unless work is done by the day and the customer made to pay all costs plus a profit, the element of gambling enters into this class of business. Some estimate work makes this unnecessary, for the customer is given a general idea of the cost, and if it is higher he must pay the difference. But usually the manufacturer makes a price, and if the cost is below it, as he plans it shall be, he makes a profit. Set backs are not so very infrequent, wiping out profits and even causing serious losses. With business as it is to-day, with a very great demand for all classes of special machinery, there is no necessity of taking chances in order to secure a shop full of busi-

ness, and prices are put up accordingly. Prices are certainly as high for this class of machinery as for regular lines of machine tools, and not infrequently they are proportionately higher.

The Martin Skate Company, Boston, Mass., manufacturer of folding skates, will be in the market for additional machine tool equipment in the near future. Its requirements will probably include turret machines, screw machines and presses.

The Carter & Hakes Machine Company, Winsted, Conn., manufacturer of machine tools, has purchased a mill property in that place, and will adapt it for the purpose of machine shops. A new building will be erected, of brick, three stories and about 60 ft. square. A portion of one of the existing buildings of the property will be occupied immediately for machine shop purposes. The company's shop was destroyed by fire something over a year ago, and temporary quarters have since been occupied. The new works will give all the room necessary for the present rapid growth and for expansion in the future.

The Puffer Mfg. Company, 44 Portland street, Boston, manufacturer of soda water apparatus, has purchased the factory at Winchester, Mass., formerly occupied as one of the works of the United Shoe Machinery Company. The buildings will provide ample space for a large industry, and few changes will be necessary in adapting them for the purposes of the new owners, who will take possession immediately. The Puffer Company states that it will require a considerable amount of machine tool equipment later on, most of it for light work.

The Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., builders of planers and engine lathes, is to build an addition to its works, 44 x 66 ft., and one story. The structure will connect the two present buildings, that of the Whitcomb Company and that formerly ocupied by the Draper Machine Tool Company. It will be devoted to additional erecting shop space, and will release some room in present buildings for manufacturing purposes.

The Boston & Maine Railroad is to make material changes to its repair shops at Nashua, N. H., increasing their capacity.

The Saco & Pettee machine shops, Newton Upper Falls, Mass., manufacturers of textile machinery, are to build an extension to their machine shop for manufacturing purposes. The building will be 58 x 80 ft., and three stories.

The Morse Twist Drill & Machine Company, New Bedford, Mass., is making large additions to its works by the erection of another story on some of its buildings, which gives 30,000 sq. ft. of new floor space. This additional space will be devoted to manufacturing, and both the machine and twist drill departments will be enlarged by a general rearrangement of manufacturing facilities. The works are rushed with business.

No decision has been arrived at as to the future of the large shops of the Shaw Machine Company, Lowell, Mass. The property was purchased by W. M. Wood, head of the American Woolen Company, who also bought a considerable number of the machine tools. It is well understood that the American Woolen Company plans to improve the equipment of some of its plants, and that the Shaw Machine Company held a contract to build for the company more than $300,000 worth of new textile machines, only a small part of which was completed when the failure of the machine company caused the shutting down of the works. The impression exists that Mr. Wood or other interests closely allied to the American Woolen Company will continue the Shaw shops for the manufacture of textile machinery, and if this proves to be a correct surmise it is certain that a considerable number of new machine tools will be needed to complete the equipment, a large nucleus of which remains from the auction sale. The machinery dealers are watching for possibilities of sales a little later, when plans for the future of the shops shall have been completed. It is said to be possible that the buildings will be used for the manufacture of textiles.

The R. Guastavino Company, Old South Building, Boston, is to erect a factory at Woburn to be devoted to the manufacture of fireproof tiles. The building will be 50 x 215 ft. and two stories, the first of stone, the second probably of tile. The company now operates a small factory at Woburn.

New railroad construction in Canada is being pushed vigorously, and the Grand Trunk Pacific expects to complete the 1900 miles it has under way before the grain is harvested. The other work in hand consists of 1270 miles for the Canadian Pacific, 1567 miles for the Canadian Northern, and 1000 miles for the Hill roads. The Dominion government grant of $10,000,000 for the Transcontinental brings the total up to $18,000,000. The Pacific & Eastern has asked a charter for a line from Victoria through the Yellow Head Pass to Edmonton, thence to Fort Churchill on Hudson Bay, claiming the possibility of a very short line to Liverpool. A land subsidy of $12,800 a mile is to be granted by Parliament.

Cleveland Machinery Market.

CLEVELAND, OHIO, August 28, 1906.

The machinery business appears to have suffered somewhat from the vacation season during the past two or three weeks, although the general sentiment among the dealers and makers is that August will prove a much better month than the corresponding month last year. Many people are looking for new machinery, but they are holding off closing the deals until this or that member of the concern returns from his vacation. At the same time there is a large class of trade that is snapping up almost anything that can be found in the stocks of dealers or manufacturers. This is particularly true of the automobile trade in this district. These manufacturers are already fairly started on next year's production, and find the prospects for next year even better than they had anticipated 30 or 60 days ago. They have been getting in machinery ordered some months ago and figured on as necessary for their increased capacity, and now they are anxious to get in more tools and are taking about anything in sight that comes near to suiting their requirements. In spite of a slight let-up on business this hot weather there are no indications that manufacturers are catching up with orders, and the situation on deliveries of certain classes of tools is becoming more and more serious. The demand for milling machines is particularly heavy in this district, and they appear to be practically out of the market. There are none of these tools on the floors and the majority of makers have capacities taken for this year, while on some sizes and makes machines cannot be guaranteed inside of a year. Lathe makers are not much better off, 60 to 90 days' delivery being about the average. Announcements of advances on prices have been coming from makers of milling machines, boring mills, drill presses and bolt and nut machinery during the past two or three weeks, and other advances are expected. Certain woodworking tool makers have also announced advances.

The White Sewing Machine Company is getting into its enormous new automobile plant, and during the past two or three weeks has been buying many extra tools not included in lists ordered some time ago. The Royal Motor Car Company and the Garford Company, both prominent in the automobile field, have made important purchases within the past few days.

The Baltimore & Ohio Railroad Company has had plans completed for a new roundhouse and locomotive repair shop to be erected in Cleveland to take care of locomotive repairs on the Cleveland Division. This will be independent of the new shops now being erected at Lorain, near this city. The local officials have made recommendations for a number of machine tools required for the new shops, but the requisitions will be made through E. H. Bankard, purchasing agent at Baltimore, Md.

The Cleveland Water Works Department has been securing figures on several new tools for its repair shop, including a 32 in. by 16 ft. lathe. Contracts are to be closed in the near future.

The Browning Engineering Company, manufacturer of locomotive cranes, has completed plans for a structural shop, 80 x 160 ft. and three stories high. Some new equipment will be installed for making boilers, bases, &c., for locomotive cranes. V. R. and E. H. Browning of this company have recently leased the plant of the American Foundry & Machine Company at Ravenna, Ohio, and are utilizing it in the production of castings for the Browning Company. The Browning Engineering Company is extremely busy on contracts for locomotive cranes, and among other orders it is building eight 10 and 20 ton locomotive cranes for the Government for the Panama Canal.

The Osborn Mfg. Company, manufacturer of brushes and foundry supplies, is erecting an addition, 60 x 300 ft., which will increase its capacity about 50 per cent. It will install considerable new metal working machinery.

Government Purchases.

WASHINGTON, D. C., August 28, 1906.

The Isthmian Canal Commission will soon ask bids, under Circular No. 326, for a hammer core machine, one cold saw for cutting I-beams, rail and channels, one automatic saw grinder, one radial drill, one universal radial drill, one 36-in. band saw, one pattern makers' lathe, one double head key lathe, two single head axle lathes, one steel tire wheel lathe, one automatic grinder, one sprue cutting machine and other supplies.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until September 18 for a blower and motor and other supplies for the Mare Island and Puget Sound navy yards.

The following bids were opened August 16, circular No. 321, for supplies for the Isthmian Canal Commission:

Bidder 5, Babcock & Wilcox Company, New York; 6, Camden Iron Works, Camden, N. J.; 16, A. D. Granger Company, New York; 18, Heine Safety Boiler Company, Philadelphia, Pa.; 21, Mann-McCann Company, Chicago, Ill.; 22, Manning, Maxwell & Moore, New York; 34, Oil City Boiler Works, New York; 35, Wm. J. Oliver Mfg. Company, Knoxville, Tenn.; 37, Platt Iron Works, Dayton, Ohio; 41, Stauffer & Eshleman Company, New Orleans, La.; 47, Vermilye & Power, New York; 49, H. R. Worthington, New York; 50, Atlas Engine Works, Indianapolis, Ind.; 56, E. Keeler Company, Williamsport, Pa.

Class 1. Ten earth spreaders—Bidder 21, $51,990; 35, $33,000 at Colon and $31,500 at New Orleans, air control add $3000.

Class 2. Two water tube boilers—Bidder 5, $5183; 16, $2900 at New York, $3100 at Colon, $3370 at Colon and $3170 at New York; 18, $5166; 34, $5300; 41, $5700; 47, $3468; 50, $3332; 56, $3500.

Class 4. Two centrifugal pumps—Bidder 6, $4850; 22, $3624.60; 37, $10,000; 41, $5390; 47, $3648; 49, $6406.

Class 5. One portable hand test pump—Bidder 22, $24.50.

The following bids were opened August 21 for supplies for the navy yards:

Bidder 10, Ajax Mfg. Company, Cleveland, Ohio; 16, F. S. Banks & Co., New York; 17, Berger-Carter Company, San Francisco, Cal.; 37, Caldwell Bros. Company, Seattle, Wash.; 43, Chicago Pneumatic Tool Company, New York; 48, Wm. Wirt Clark & Son, Baltimore, Md.; 53, Dunham, Carrigan & Hayden Company, San Francisco, Cal.; 54, Drew Machinery Agency, Manchester, N. H.; 71, J. A. Fay & Eagan Company, Cincinnati, Ohio; 74, Gamwell & Wheeler, Seattle, Wash.; 75, R. W. Geldart, New York; 80, General Electric Company, Schenectady, N. Y.; 90, Henshaw, Buckley & Co., San Francisco, Cal.; 91, Holtzer-Cabbot Electric Company, Brookline, Mass.; 94, Handlan-Buck Mfg. Company, St. Louis, Mo.; 95, Harron, Ricard & McCone, San Francisco, Cal.; 130, Marine Mfg. & Supply Company, New York; 144, Wm. B. Mershon, Saginaw, Mich.; 150, Montgomery & Co., New York; 152, Manning, Maxwell & Moore, New York; 155, Manhattan Supply Company, New York; 164, Northern Electrical Mfg. Company, Madison, Wis.; 177, S. M. Price Machinery Company, Norfolk, Va.; 186, Randolph-Clowes Company, Waterbury, Conn.; 188, H. A. Rogers, New York; 190, John B. Roach, Brooklyn, N. Y.; 214, Sprague Electric Company, New York; 216, Sherman-Brown-Clements Company, New York; 241, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.; 242, Western Electric Company, New York.

Class 3. One 40-in. combination band saw machine—Bidder 37, $769.50; 71, $875; 74, $549; 144, $698.51.

Class 23. Eight hydraulic jacks—Bidder 53, $654; 74, $479.34; 94, $508; 150, $680; 177, $515; 186, $647.42; 190, $493.20; 216, $599.

Class 41. One 20-hp. motor and one 15-hp. motor—Bidder 80, $522; 241, $534.

Class 47. Nine hydraulic jacks—Bidder 48, $405; 53, $419.19; 74, $469.10; 94, $441.30; 150, $525; 177, $480; 186, $417.90; 190, $428.55; 216, $414.

Class 48. One portable pneumatic punch—Bidder 17, $920; 43, $975; 90, $865.

Class 49. Six bilge pumps—Bidder 74, $203.70; 95, $168; 130, $150; 152, $210.

Class 71. One 4-in. heading upsetting and forging machine—Bidder 10, $6690.

Class 111. One valve reseating machine—Bidder 16, $90; 54, $90; 75, $90; 152, $90; 155, $90; 177, $90; 190, $90; 216, $90.

Class 188. Seven hydraulic jacks—Bidder 150, $526; 152, $399.42; 17, $395; 190, $398.70.

The following awards have been made for supplies for the navy yards, bids for which were opened August 14:

Brownell-Trybert Company, Rochester, N. Y., class 132, one gasoline marine motor, $1780.75.

Manhattan Supply Company, New York, one valve reseating machine, $90.

J. B. Roache, New York, class 164, three hydraulic jacks, $119.40.

Under bids opened August 9, Circular No. 320, for supplies for the Isthmian Canal Commission, class 14, six pipe bending machines, has been awarded to Manning, Maxwell & Moore, New York, at $853.62.

It is officially stated that the Niagara Falls Electrical Transmission Company has purchased 50,000 electrical horsepower from the Electrical Development Company of Ontario, Ltd. This power will be transmitted to Niagara Falls, N. Y., from the Canadian side, as well as being also transmitted to other parts of western New York. According to the Department of the Interior of the United States, the productive value of every electrical horsepower in the State of New York is $100 per annum, so that this 50,000 horsepower will have a productive value of $5,000,000.

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HARDWARE

WHETHER a Hardware manufacturer confines his business principally to the jobbing trade or goes to the retail merchants direct usually depends largely on the character of his product. His decision, however, as to the channel through which his goods go to the trade is often determined by circumstances, as for one reason or another he finds it desirable to adopt a certain course of action, whether it be limiting his dealings largely to the jobbers as do many manufacturers, going both to jobbers and retailers as do probably the majority, or depending exclusively upon the retail merchants as is the course with not a few manufacturers, a good proportion of whom are in the line of specialties, while some are makers of standard goods. The finding of a market by a manufacturer is not an easy thing, and the finding of the most desirable market is one of the problems constantly coming up for solution. It may be necessary for him under the exigencies of business to adopt one policy or another. Indeed, in not a few cases he is practically forced for the introduction of his goods at the first, and for the sale of them subsequently, to go direct to consumers, small or large, passing over the merchants, wholesale and retail, who are theoretically the normal distributors. With the diversity of channels of distribution and the constant changing of such channels are connected some of the gravest trade questions which present themselves for consideration and solution.

One of the large manufacturers of goods which enter into the stock of most Hardware establishments affords an illustration of a change in policy toward jobbers and retailers, and a gradual turning from the former to the latter as distributers. Formerly jobbers were given, as is so usual, special inducements to handle the company's goods. This practice was slowly done away with, as business direct with the retailer was made to grow. The company was enabled to adopt this policy, as the country is very carefully covered by the company by means of a large corps of traveling men. The jobbers became more and more unnecessary as the list of direct customers was increased. It is not expected by this house that the jobber can ever be completely done away with, for certain sections of the country are not populous enough to pay for the presence of traveling men, and other sections are controlled to an extent by the jobbers. It must be stated that this particular company manufactures a very strongly established line, with a reputation that goes beyond the dealer to the customer, so that it is usually necessary for the dealer to carry its goods, and this, naturally, accounts for somewhat of the independent position which is taken toward the jobber.

The evolution of methods in this case has finally resulted with this house in a fixed rule that no jobber can get a discount beyond that allowed to the retailer, for the reason that he is a jobber. In certain instances where the jobber buys in very large quantities he is allowed certain price advantages, but this is not because of the fact that he is a middleman, but because of the amount of the business. The retailer who would buy in like quantity would receive the same terms. Requests for advantageous discounts are constantly being received from jobbers, and at times there has been temptation to yield, as, for example, where a very material percentage of the total product of the factory was wanted by a single house. Yet the offer was refused, carrying out the rule. To-day this particular factory is rushed to the limit with orders, even to the point of operating night gangs. The question of price does not enter into sales to any great extent. Goods are wanted, and they must be had. In the face of such conditions there is, of course, little necessity for giving the jobber lower prices than the retail trade. It is the same in less prosperous times so far as the rule is concerned. Experience has shown that the retailers can be given the same price as the wholesaler without loss of business, according to the statement of the officers of this company. With many manufacturers there might be obstacles in the way of the consistent and uniform carrying out of such a policy, a consideration which brings us back to the general principle that this is a matter which each manufacturer must determine for himself.

Condition of Trade.

As August has drawn to a close the increase in the value of business has probably been more noticeable with the manufacturers than with the jobbers. The state of the market has been such and the outlook for business so promising that the larger buyers, prompt to discover the signs which point to a heavy business during the fall and winter, and feeling the effect of the strengthening tone which characterizes the market, have been placing many orders, in some cases supplementary to those already booked for them. In this way the remarkable strength and activity of the summer market have not only continued but become more pronounced at the close of what is usually a comparatively quiet season. Meanwhile, the jobbers have been doing an excellent and steady business, and are entering actively upon the fall campaign, making their arrangements for a large business, and in most cases adopting aggressive methods to extend their trade relations. It is indeed a time when all departments of the trade are looking forward to the coming months with expectancy, and endeavoring to secure for themselves a good share of the prosperity which prevails, and fortunately promises to continue. Under these conditions the force of traveling salesmen are resuming their activities, and already beginning to make their presence in the market felt, an easier task than sometimes, as the state of the trade is such as to give them many advantages in the selling of goods. Indeed, there is more difficulty in the obtaining of goods than in the sale of them, as a growing number of factories are even at this time behind their orders. Difficulty in getting raw material is causing some inconvenience and delay. The railroads, too, are in not a few cases unable to transport merchandise without causing consignees serious inconvenience and ground for complaint on account of the length of time involved in transit. Retail merchants generally report business good, building in most communities being active, and evidence furnished on practically every hand of the financial comfort and wellbeing of the people. The demand for labor indeed is generally in excess of the supply, and with skilled labor the tendency is little by little to somewhat higher wages. The influence of this is felt in manufacturing communities, and involves a gradual, though almost imperceptible, in-

crease in the cost of goods. With this condition the merchants can sympathize, as they are compelled to reckon with a constant increase in the cost of doing business.

Chicago.

While the present month will show a comfortable increase in the volume of business transacted by large Western jobbers and distributers as compared with August last year, the proportionate expansion of trade established during July has not been maintained. This is largely accounted for by the large number of filling-in orders for summer goods placed by retailers last month, and many contracts previously placed by these merchants during August for their future requirements were closed during the same period to insure the early delivery of fall goods. That consumption is not on the decline is indicated by the heavy continued demand for staples, Shelf Hardware moving very freely from jobbers on account of the delayed shipments from the manufacturers. From a manufacturer's viewpoint, August has been a phenomenal month. Sales of Wire products have exceeded all previous records, and the makers will be hard pressed to fill specifications, as the output of their mills was greatly curtailed not only on account of the steel shortage, but the scarcity of labor during this heated period as well. Heavy contracts were also placed by jobbers for their future requirements, covering all lines of spring and summer goods. The Wire Cloth schedule has not yet been announced, although one Eastern manufacturer is taking orders, according to reports, at a price to be fixed when the basis for next season is established. All kinds of Screws continue scarce, and notwithstanding the advanced building season, manufacturers are from three to four months behind on shipments. Nor is there any appreciable easing off in the demand for Builders' Hardware, and building operations are now frequently delayed on account of the nondelivery of material. The enforcement of the Wide Tire ordinance in this city, which will necessitate the equipment of practically all vehicles with new wheels, has resulted in an unprecedented demand for Woodstock and Tire Steel, and the jobbers of Heavy Hardware are experiencing much difficulty in securing material. The ordinance provides for Tires ranging from 1 to 8 in. in width, according to the capacity of the wagon, and the number of vehicles now in service conforming with these requirements is comparatively small.

NOTES ON PRICES.

Wire Nails.—Demand is reported far ahead of all previous records, and requests for prompt shipments are so imperative that the largest interest is not only accumulating no stocks, but will soon, if present conditions continue, find it difficult to fill orders with any degree of promptness. The scarcity of Steel is retarding the production of Nails and Wire, with no prospect of immediate improvement in the supply. A car shortage, arising from the large movement of merchandise, is being felt to quite an extent, and when the movement of crops and shipments of merchandise to points on the Great Lakes before the close of navigation commence this will become more pronounced. Conditions all point to a scarcity of Nails and difficulty in getting prompt deliveries before the fall requirements of the trade have been supplied. The market has taken on a stronger tone, and the concessions in price, which have of late been made very sparingly, are practically withdrawn for new business, except by some of the smaller mills. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers	$1.85
Carload lots to retail merchants	1.90

New York.—Business for the month has exceeded that of July. Demand for small lots from store in some parts of Greater New York has been light, but requirements from other nearby territory have been excellent. Quotations for small lots from store are on the basis of $2.10 per keg.

Chicago.—The volume of new business closed by the mills during August reached a total never before obtained in the Wire trade, and the activity in all lines during the month has been unparalleled in the history of the industry. Specifications are rapidly accumulating, as they show an average daily excess over mill production of from 50 to 60 per cent., and shipments are gradually being further deferred. That the mills will be unable to supply the heavy fall demand for Nails is already apparent, and shipments will be apportioned and deliveries made to the points of greatest need. Confronted with a shortage of Steel, which promises to become more acute during September and October, production is considerably below normal, and there is no relief in sight in the immediate future. Notwithstanding the withdrawal of all special concessions by several of the leading interests to all purchasers, including the leading distributers, several of the smaller mills are shading quotations $1 a ton. Jobbers report heavy shipments to the retail trade and the numerous insistent demands of quick delivery are indicative of the small stocks on hand. Quotations are firm but unchanged as follows: $2 in car lots to jobbers and $2.05 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—Usually at this season of the year the Wire Nail makers are importuning the large trade to place contracts, but this year the situation is reversed. In view of the continued scarcity and high prices of Steel together with an almost certain advance in Wire Nails this fall, the large jobbing trade is anxious to cover ahead as far as possible on Wire Nails, and has placed some heavy contracts for shipment up to November 1. The mills have a very much larger tonnage on their books than usual at this time of the year, and in some quarters the belief exists that there may be a shortage in Wire Nails when the expected heavy fall business opens up. The tone of the market is very firm, concessions in prices ruling in June and July having practically disappeared. We quote: Wire Nails, $1.85 in carloads to the large jobbing trade and $1.90 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days.

Cut Nails.—Including current demand, specifications on contract orders and contract orders being placed, demand is seasonable. Owing to the scarcity of steel, it is becoming a question with some manufacturers of Nails whether they will be able to secure sufficient raw material to meet their requirements for the future. Nails are scarce, and manufacturers are not able to accumulate stocks. Concessions on official prices of 5 cents per keg, f.o.b. Pittsburgh, are understood to be more or less general. Official quotations are as follows: $1.80, base, for carload lots, f.o.b. Pittsburgh; $1.85 for less than carloads, f.o.b. Pittsburgh; $1.95 for carload lots, on dock, New York; $2 for less than carloads, on dock, New York. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

New York.—No change has taken place in the condition of the local market. Demand from store continues steady and seasonable. Quotations for small lots from store are on the basis of $2 per keg.

Chicago.—While the buying for the fall trade is heavy, the demand shows little increase over that prevailing a year ago, and it is evident that distributers are not going to place the bulk of their tonnage until early in September. Concessions of $1 a ton can still be secured from some of the mills, in spite of the heavy cost of raw material. Quotations prevail as follows: Steel Cut Nails, in car lots, $1.90 to $1.95; less than car lots, $2; Iron Cut Nails, $2 to $2.05, in car lots; less than car lots, $2.10.

Pittsburgh.—We note a seasonable demand for Cut Nails, and some of the large jobbing trade are placing contracts for fall delivery, believing that such a course is wise, in view of the scarcity of steel and the possibility that prices may be advanced at the next meeting of the Cut Nail Association, to be held in September. Buyers are specifying freely on contracts and the mills are shipping their output as fast as made. We quote Cut Nails at $1.75, base, f.o.b. Pittsburgh, for carload

lots, and $1.80 in less than carload lots. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

Barb Wire.—The mills are well booked up on orders owing to the heavy demand. Prices are firm and well maintained, except by some of the independent mills, which are reported as making concessions of $1 per ton on large contracts. Quotations are as follows, f.o.b Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.00	$2.30
Retailers, carload lots	2.05	2.35
Retailers, less than carload lots	2.15	2.45

Chicago.—The tonnage closed by the mills during the present month reached a total unprecedented in the trade for a similar period, and even surpasses former high records established during the months of January and February, when the Barb Wire trade is at its hight. The withdrawal of all concessions by the largest producer has not been followed by all of the independent mills, as several are still shading prices $1 a ton on large contracts. The following quotations prevail: To jobbers, Chicago, car lots, Painted, $2.15; Galvanized, $2.45. To retailers, car lots, Painted, $2.20; Galvanized, $2.50; Retailers, less than car lots, Painted, $2.30; Galvanized, $2.60; Staples, Bright, in car lots to jobbers, $2.10; Galvanized, $2.40; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Present demand for Barb Wire is probably heavier than ever before in the history of the trade, the large jobbers and consumers placing contracts for fall delivery. The scarcity of Steel is restricting output, and indications are that the mills will have all the business they can take care of when fall trade opens up. Prices are very firm and, we are advised, are being rigidly held. We quote: Painted Barb Wire, $2, and Galvanized, $2.30, in carload lots to the large jobbing trade, with the usual advance of $1 a ton to retailers in carload lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Smooth Fence Wire.—Orders are being received in large volume by the mills, and specifications on contracts are coming in freely. The market is firm and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.70
Retailers, carloads	1.75

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—Manufacturers of Woven Wire Fencing, who have covered their requirements with the Wire mills to July 1st, next year, are now specifying heavily and report a tremendous demand for their product, some of the makers having booked twice as much tonnage during August as during the same period last year. Quotations are without change as follows: Jobbers, $1.85, f.o.b. Chicago, in car lots; retailers, $1.90.

Pittsburgh.—The mills have booked a heavy tonnage for delivery up to November 1, while orders continue to come in very freely. The trade is buying liberally in the belief that prices may be advanced before long, and in view of the heavy demand, and scarcity and high prices of Steel, this seems probable. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.70
Retailers, carloads	1.75

The above prices are for base numbers, 6 to 9.

Bolts and Nuts.—Conservatism still marks the course pursued by manufacturers of Bolts and Nuts, and no change in prices was made this month, although market conditions are said to be such that an advance would not be unwarranted. Indeed, it is understood that an upward move was favored by some interests, although the more moderate counsel prevailed. Manufacturers have all the business they can handle for weeks to come. Deliveries, especially of heavy goods, are very slow, and the prospects are for an increase rather than an abatement in the consumption which has been taxing productive capacity for so many months.

Cast Iron Hardware.—Prices on Cast Iron Hardware, including Pulleys, Well Wheels, Grindstone Fixtures, Hay Fork Pulleys, &c., show a strengthening tone. Some manufacturers, whose prices have been the lowest, are raising their quotations about 5 per cent. It is understood that stocks of raw material purchased at lower prices than are now current are about exhausted.

Tin and Galvanized Ware.—The new price-list on Tin and Galvanized Ware, which the leading manufacturing interests have had in process of compilation, as previously reported in these columns, is now completed and will, it is understood, shortly be placed in the hands of the trade by the individual manufacturers, who are acting in concert. The schedule is such that, with the discounts which will probably be offered to different classes of buyers, the market level will remain about the same as for the past few weeks, representing a noticeable advance over prices previously prevailing.

Crow Bars and Wedges.—There has been a slight strengthening in prices on Crow Bars and Wedges, quotations on these lines being influenced by the strengthening market for raw material. A similar condition prevails in the case of other heavy goods, sometimes with and sometimes without a slight advance in price.

Lumbering Tools.—The American Logging Tool Company, Chicago, has been organized, with officers as follows: President, H. H. Bassett; vice-president, Benjamin Wolf; secretary and manager, N. W. Ely; treasurer, C. A. Libbey. The principal office of the company will be to act as distributing agent for the following concerns: Clyde Iron Works, Duluth, Minn.; Champion Tool & Handle Company, Evart, Mich.; A. Sanford Logging Tool Company, Oshkosh, Wis.; Morley Brothers, Saginaw, Mich.; Evart Tool Company, Limited, Evart, Mich.; Oshkosh Logging Tool Company, Oshkosh, Wis., and the Columbus Handle & Tool Company, Columbus, Ind. Mr. Ely was formerly associated with Morley Brothers of Saginaw. The company is located at 38 South Canal street, Chicago.

Sheets, Black and Galvanized.—The market for Black and Galvanized Sheets is characterized by great strength, especially in the case of the latter product, deliveries of which cannot be secured under two to three months, except at the payment of liberal premiums. The situation on Black Sheets is not so bad, deliveries being obtainable in about four weeks. Corrugated Sheets and other semifinished products are fairly prompt. The strength of the raw material is of course reflected in such finished goods as Conductor Pipe, Eaves Trough, &c., but prices remain steady and shipments are satisfactory. Manufacturers naturally prefer to devote their energies and output to these lines, which pay them a much better profit than the raw Sheets.

Dividers and Calipers.—An advance has been announced by several manufacturers of Dividers and Calipers. The present market price to good retail trade may be fairly represented by a discount of 75 per cent.

Spool Wire.—The notable strength of the Wire market and of Wire goods generally was lately reflected in a moderate advance in Spool Wire, Tinned and Annealed, and also Copper and Brass.

Fruit Jars.—A large volume of business is reported in Wax Top Fruit Jars, which are being handled in increasing quantities by the Hardware trade, especially in the West. Prices have recently been advanced in the neighborhood of 15 cents per gross.

Rope.—Manufacturers report a good business, and some state that their mills are overcrowded with orders. Complaint is heard from some sources that not as good prices are obtainable for Manila Rope as the advance in Manila Hemp would justify, because so many inferior grades of Rope are on the market. Jute products are very firm in price, and manufacturers are not anxious to accept contract orders for large quantities, with deliveries extending over a considerable period. New York

quotations on Rope are as follows: Pure Manila, 12¼ to 12½ cents; B quality, 11½ cents; Pure Sisal, 9 cents; No. 2 quality, 7¼ to 7½ cents per pound.

Jute Wool Twine.—A condition of much unsettlement prevails in the Jute market, due to uncertainty as to the supply and price of raw hemp. Many manufacturers find themselves considerably embarrassed by scarcity of stock, and are able to give but little satisfaction to inquiring customers. Few, if any, will quote on carload orders or accept contracts for future delivery, making prices only for current requirements and subject to change without notice.

Window Glass.—A meeting of Glass manufacturers and workers has been held without producing any definite results regarding wages or when the factories will start up. As the supply of skilled workmen was not great enough to man all the Glass factories, last fire, the most important association of workers has the advantage over the unorganized manufacturers, and are using it by naming certain conditions in view of making an effort to delay the resumption of factories. As far as reports go, no mention was made of wages at this meeting, and it is generally understood that an advance, over those of last fire, will be paid. A plan is said to be on foot to form a manufacturers' organization to handle the product of a large percentage of the factories. At present the prospect of forming such an organization does not appear encouraging. The early start of factories would probably bring about a demoralization of the market, and conditions would be somewhat along the lines of the past season, as far as the manufacturers making money was concerned. Jobbers' quotations, from jobbers' list, October 1, 1903, are as follows: Greater New York, single, 90 and 5; double, 90 and 10 per cent. discount. Eastern District, except the Boston District, 90 and 10 per cent. discount for all sizes of single and double strength. In the Boston District quotations are reported as being 90 and 15 for all sizes of single and double strength. The market is somewhat weak, owing to lack of demand.

Linseed Oil.—Demand is moderate for small jobbing lots in this market. Crushers are still unwilling to shade regular quotations, even to secure large contract orders. In view of the new crop of seed, prices have a declining tendency. New York quotations are as follows, according to quality and seller: City Raw, 38 to 39 cents per gallon; out of town Raw, 36 to 39 cents per gallon. Boiled Oil is 1 to 2 cents advance per gallon over Raw.

Spirits Turpentine.—Rainy weather in the South, preventing the movement of Turpentine from the forests to the points of distribution, export demand and buying up of supplies by operators has advanced prices about 1½ cents in this market. Local dealers confine their purchases to small lots. New York quotations are as follows, according to quantity: Oil Barrels, 62½ to 63 cents; Machine Made Barrels, 63 to 63½ cents per gallon.

THE SHELBY SPRING HINGE COMPANY.

THE SHELBY SPRING HINGE COMPANY, Shelby, Ohio, has recently acquired the plant of the Van Wagoner Company, Cleveland, which manufactured ball-bearing Spring Hinges, Coat and Hat Hooks, the Van Wagoner holdback steel Screen Door Hinge and other Hardware specialties, together with all patents, patterns, dies and kindred property. The Van Wagoner business went into the hands of a receiver in June, and the plant is now being moved to Shelby. The company announces that it will at once begin the production of the Van Wagoner line, in connection with its own Shelby Chief double acting Floor Hinges and Hardware specialties. The surplus machinery not needed will be disposed of.

THE Executive Committee of the Ohio Hardware Association will meet at the Southern Hotel, Columbus, Ohio, on Wednesday, September 5. Plans will be discussed and partial arrangements made for the next annual convention, which will be held in that city, February 26, 27 and 28, 1907.

FIRST SASH WEIGHTS FROM TIN SCRAP.

THE keenness of individuals frequently for turning to profit, and often fortune, what had long been accepted as waste, by finding for it a commercial use, is again illustrated in the following incident, confirming the axiom that "dirt is misplaced matter." Some time in 1879 Jesse W. Starr, Jr., at Point Breeze, Philadelphia, Pa., noticed an immense pile of tin scrap, then considered as not only of no use, but as an unmitigated nuisance to dispose of, and which in the course of business was being carted away from factories to dump piles to be used for filling. It occurred to Mr. Starr, who in 1872 had begun his business life with his father, Jesse W. Starr (who owned both the West Jersey Foundry, at Coopers Point, Camden, N. J., and the Camden Iron Works, in the same city, about a mile away), to convert one such pile of waste into Sash Weights. So far as Mr. Starr is informed, this is the first instance of making Sash Weights from tin scrap or other than regular pig iron. His idea was to buy the pile in question, containing from 3000 to 4000 tons, but before he got that far the owners had offered to pay him 50 cents a load (such as could be hauled on a big wagon with hay racks) to remove the refuse. Near by was a corresponding pile of oil carbon, a refuse or deposit from the inner linings of oil retorts that had to be cut out of the latter at intervals. In the carbon pile was approximately 1000 tons, which Mr. Starr was also paid at the rate of 25 cents for a reasonable load to take away.

Mr. Starr, however, with his contract executed, set up a cupola on the spot convenient to the two piles of refuse and went to melting the scrap and using the carbon as fuel. On account of the light character of the metal the scrap was rammed into an improvised cast iron form about 15 in. square at top and 14 in. square at bottom, with a depth of 12 in., thus enabling the mass to be easily lifted out by means of a wire first laid in the cavity before filling. This treatment of the scrap was necessary to prevent the otherwise light material from being blown out of the stack in fumes by the force of the Sturtevant blower, which was a part of the plant. All sizes of Weights were made at a cost then of about $11 per ton to manufacture, and disposed of in lots of 10 to 40 tons to Philadelphia Hardwaremen exclusively, at an average of about $25 a ton, at a time in that boom year when ordinary pig iron was over $30 per ton.

Mr. Starr worked a year at this business, utilizing as well other similar scrap piles in the neighborhood for which he bargained, paying for the material, carting it himself and buying coke for fuel. As the makers of the scrap realized the profit in the business, it may be added, they ceased to dump in that pile and sold to others who went into the business of making Sash Weights of this by-product. Toward the end Mr. Starr sold Sash Weights as low as $16 per ton, making in all, as near as he can recall, from $15,000 to $20,000 in the venture.

H. F. BRAMMER MFG. COMPANY, Davenport, Iowa, is marketing its new Royal Blue Washing Machine on the exclusive agency plan, that is confining the sale of the washer to but one merchant in a town. The company wil be glad to hear from merchants in cities and towns where the washer is not yet handled. The Royal Blue machine is described as made of the best materials and by experienced mechanics. A special feature is the small number of castings which constitute the gearing, and the ease with which any broken part can be replaced. The machine is handsomely and durably finished.

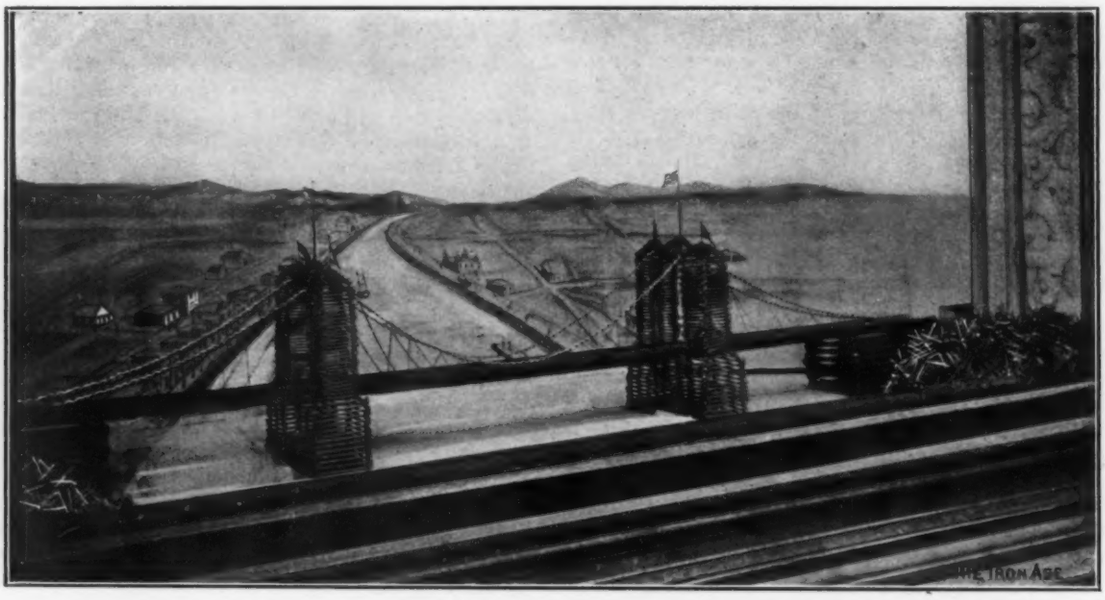
FOLLOWING its usual custom the Union Metallic Cartridge Company has issued a number of lithographed hangers designed for the use of merchants in calling attention to ammunition stock during the hunting season. The hangers are attractively gotten up and brightly colored. Merchants have only to drop a postal to the advertising department of the company, 313 Broadway, New York, to receive a package of hangers suitable for complete window display.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

SUSPENSION BRIDGE WINDOW EXHIBIT.

A WINDOW EXHIBIT which occasioned a good deal of favorable comment was recently gotten up by M. V. Secor, who is connected with the Hardware store of Marvin Bros., Grinnell, Iowa. The accompanying illustration gives a pretty good idea of this artistic display. The approaches of the bridge consisted of Bolts, the center piers having been Nails, supported on a wire framework, starting with 60d. at the bottom. The girders were Angle Irons, with 40d. Nails laid across for a driveway. Brass Chain supplied the cables, with small Chain for stays. The background was common wrapping paper,



Suspension Bridge Window Exhibit.

the sketch on which was drawn with charcoal from the tinner's firepot.

NEWSPAPER ADVERTISING BRINGS BUSINESS.

JONES HARDWARE COMPANY, Richmond, Ind., has tried various methods of advertising, and after much experience and observation has reached the conclusion that the most satisfactory is the perpetual regular space in the daily papers, with frequent changes of matter. The company's custom is to advertise continuously throughout the year in at least two good newspapers in Richmond and also in those published in several smaller places within a radius of 20 miles of that city.

Contract is made for certain space, and the text of the ad. is changed every third insertion. The space generally occupied is three columns wide by 6 in. high, and the location the upper left-hand corner of the second page. The company refers to this method of making announcements as the most profitable. People do not weary of the ad., as it is changed every third day, thus giving the house an opportunity of calling attention to various lines of goods, each in its season.

While the company does not do much in the way of circular advertising, a rule is made to inclose leaflets or other trade literature in all local mail matter, and at certain seasons of the year the rural routes are circularized, calling attention to various lines in which farmers are especially interested.

Last year at about this season billboards with large posters were used to feature the company's lines of Stoves. These posters were in colors, and 3 x 6 ft. in dimensions.

This establishment also gives a good deal of attention to the arrangement of goods in the show windows, and an earnest endeavor is made to have them tastefully and attractively trimmed. The company conducts its large and steadily growing business on the principle that success can only be obtained by "pounding away without ceasing."

GOING AFTER BUSINESS IN ARKANSAS.

HAMP WILLIAMS, Hot Springs, Ark., who is an ex-president of the Hardware Association of that State and recognized as an enterprising merchant and a resourceful canvasser for business, keeps a very complete record of sales of certain lines of goods so far as the purchasers are concerned. For example, in Woven Wire Fence besides the name and post office address of the purchaser, the date of sale, hight of Fence, quantity sold and price are recorded. Data of somewhat similar character is compiled relating to buyers of Wagons, Buggies, Mowers, Stoves, Cultivators, Disk Harrows, Sorghum Mills, Sewing Machines, &c. This information is used in influencing others in the neighborhood of the purchasers to buy.

Mr. Williams states that he is favored by manufacturers with large quantities of printed matter, circulars, booklets, leaflets, &c., which they are glad to send him, knowing that he makes good use of them in distribution to the people of his territory. Circular letters are sent out from time to time and are found to be effective.

His newspaper advertising takes the form of catchy "locals" in the reading columns rather than standing ads occupying a regular space. In this way attention is called to single items or lines. Prices are never mentioned, although Mr. Williams realizes that many successful Hardwaremen do so. He reasons that if he names a low price on a staple article his competitor will go below him if possible, while if he names a low figure on a special brand or some article not handled by his brother merchants, the article will be condemned because of its cheapness.

NEWSPAPER ADVERTISING.

IRVING A. SIBLEY, South Bend, Ind., who conducts an extensive business in General Hardware, Stoves, &c., is not in the habit of carrying a regular space in the newspapers. His policy is to call attention to certain

lines in the season and then to occupy lots of space and bring them forcibly to the notice of the public. His experience has been that better results are thus obtained than by advertising all the time in a regular space of stipulated size.

One of Mr. Sibley's ads., featuring Stoves, is reproduced herewith. This announcement was 6½ in. wide by 8 in. high, which is a moderate space for Mr. Sibley, who when circumstances appear to warrant it contracts for large portions of a page.

SMALL HEATING STOVES
For Early Fall Use.
HEATING STOVES
HEATING STOVES
We have received a full line of
Oil Heating Stoves, each, at from $3.50 to $5
Gas Heating Stoves, each, at from $2.50 to $7
Wood Heating Stoves, each, at from $1.50 to $12
Coal Heating Stoves, each, at from $3.00 to $12
In sizes suitable for use before starting furnaces or base burners.
Damp, chilly mornings and evenings, we find a need of, and real comfort in just enough heat (not too much), to take the chill off. Realizing this, we have purchased a large assortment of stoves especially built to fill this want. They are also useful all through the winter for heating, in many places.
We sell on long time and easy payments.
IRVING A. SIBLEY,
Open Thursday and Saturday Evenings. 128-30 S. Michigan St.

Stove Ad. Reduced from 6½ In. Wide by 8 In. High.

HOUSEFURNISHING SALES.

Fall and Spring sales of House-Furnishing Goods cannot be overestimated as a business builder.

BY CLARFIELD.

THE average retail Hardware merchant does not take advantage of his opportunity to increase his business through large special sales planned to appeal especially to women. There is a broad field in this direction that can be cultivated by any Hardwareman, no matter where his business is located.

Advertising Too Persistently to Men.

It is a mistake very generally made by Hardware merchants to advertise continually those lines of merchandise which appeal to men. They depend upon the men's interest in the store to bring the household trade of the women. This is wrong, because many women buy all of the household supplies, and make their purchases where they think they can buy to the best advantage, regardless of where the men purchase the articles they may need.

Example of City Merchants.

Many of the large city merchants have found it very beneficial to plan semiannual or quarterly sales of household and kitchen needs, and advertise them widely. Special goods are bought for these occasions or prices reduced in order that results may be as great as possible. If such an effort is properly carried out it will benefit the store permanently by the talk it creates and the customers which it wins for the future.

A Sale of Seconds.

A sale of seconds in enamel ware nearly always proves to be a great success, but of course it never does to advertise these goods as first quality. In fact, it is better to state plainly that the goods are somewhat damaged, though perhaps not injured for practical purposes, and for that reason they are offered at reductions of one-fourth or one-third.

The Best Seasons.

Spring and fall are of course the best times to have such sales as these because those are the times when most housekeepers are cleaning and refurnishing. It is best to devote more space to this advertising than is usually taken for the regular requirements. The entire advertisement should be devoted to kitchen utensils and household needs, leaving the other lines which more directly appeal to men for other announcements. Even in the smaller towns and villages this idea can be effectively carried out if it is carefully planned.

A MARYLAND VIEW OF NEWSPAPER ADVERTISING

"ADVERTISE the right sort of goods at the right prices, and make a big fuss about it in the best papers you can find," is the way that newspaper advertising strikes the L. W. Gunby Company, Salisbury, Md. This firm makes it a point to advertise but one article or line at a time, and always with an illustration. It conducts an extensive business in Hardware and Machinery, and in connection with its ads. reference is frequently made to Gunby's emporium as the "Mammoth Hardware and Machinery Store," a phrase which has become very familiar to the patrons of the house.

Some months since, with a view to impressing the public with the magnitude of the company's stock, a series of advertisements appeared in the papers in which an alphabetical list of the goods handled was presented. This made a very imposing exhibit, the A's and B's being enumerated one day, C's and D's another, &c. This list, which was printed in small type in three columns, supplied the body of the advertisement, the intimation appearing below that "anything in the Hardware line" could be had by calling on or addressing the firm.

TRADE ITEMS.

HERBERT STORY, 23 Duane street, New York, handling complete lines of Masons', Cement and Stone Cutters' Tools, as well as the numerous tools used in silk factories, is now manufacturing a line of Mallet and Hammer Lead Marble and Stone Cutters' Chisels, in all standard styles and shapes. They are made in regular sizes, 7¼ and 7½ inches long, and include Drills for granite and brick, Points, Chisels, both regular and tooth; Pitching Chisels, Star and Brick Drills, &c., all in black oil finish and guaranteed of best quality.

INDIANAPOLIS, IND., is to be congratulated on the decision of E. C. Atkins & Co. to remain where they have been continuously located for a period of 50 years. They have recently been considering the advantages offered by other cities, but have come to the conclusion that everything taken into account they are better off where they are than if the extensive plant was removed to some other point.

THE BULLARD AUTOMATIC WRENCH COMPANY, Providence, R. I., manufacturer of Automatic Wrenches, has issued an attractive circular in the form of a grip, colored to represent leather, and bearing upon each side the words "It's all in the grip." The bag opened reveals half tone cuts of the Bullard Automatic Wrench and a brief and pointed description of the tool.

C. F. Stork has purchased the business of the Gem City Hardware Company in Moscow, Idaho. The lines handled include Shelf and Heavy Hardware, Stoves, Tinware, Paints, Oils, Sporting and Athletic Goods.

STATEN & KING, Florence, Ala., wholesale and retail Hardware, Stoves, Mill Supplies, Sporting Goods, &c., have recently taken possession of a new building which they own at corner of Court and TomBigby streets. This building is 53 x 148 ft., three stories high. The new quarters are considerably larger than the old, permitting the accommodation of a more ample stock, while the opportunity for display has been greatly improved.

A BUYER'S RECORD OF STOREHOUSE STOCK.

THE accompanying diagram illustrates a method of recording purchases and storehouse stock, suggested by J. W. Cleveland Hardware Company, Paterson, N. J. It affords a system of keeping track of bulky lines, often purchased in carload lots, which many merchants do not have room for in the store proper but accommodate in a storehouse, getting out small quantities as needed for the selling stock. Such goods would of course vary according to the facilities of a merchant and the character of his trade, but they would naturally include several seasonable lines which are often bought and delivered some time before they are in demand.

Convenient for the Buyers.

A feature of the system is that it affords the buyer a reliable record of stock on hand at any moment, without going or sending to the storehouse to ascertain. It is also an invaluable guide as to the quantities which should be ordered, especially in seasonable lines. The record is kept in an ordinary blank book of plain, horizontal ruling, on which vertical lines are drawn, as shown in the cuts, which illustrates a record referring to Screen Doors, for the years 1905 and 1906. This of course is not the company's actual business record, fictitious figures being used to indicate the system. Goods are designated by grade or manufacturers' number in the first column and in the next by size. Two blank columns are provided under each year, the quantities purchased being entered in the column on the left. Each time goods are transferred

Screen Doors

No.	Size	1905		1906	
04.	2-6×6-6	25 dz + 5	[illegible]	35 dz	
"	2-8×6-8	20	[illegible]	25	
"	2-8×7	15	[illegible]	15	

A Buyer's Record of Storehouse Stock.

from the storehouse to the store an entry is made in the right hand column, indicating the quantity remaining in the storehouse; that is, the amount removed is subtracted from the amount on hand and the result is entered, while the previous entry is crossed off. Similarly, all incoming goods are of course added to the amount.

Purchases and stock being indicated in this way the buyer's use of the record will be entirely clear. In the case of 2.6 x 6.6 Screen Doors, the stock of 25 dozen originally purchased was reduced to 5 dozen so early in the season that 5 dozen more were ordered. These came in, bringing up the stock to 10 dozen again, but it was gradually reduced until none remained in the storehouse at the end of the season, although it may be supposed that there were still a few Doors of this size in the store. Having handled 30 dozen in 1905, and having reason to expect an increase in business for the succeeding year, the buyer ordered 35 dozen for the season of 1906. Twenty dozen 2.8 x 6.8 Doors were purchased in 1905, and only 2 dozen remained in the storehouse, so the quantity was increased to 25 dozen in the 1906 order. The 2.8 x 7 Doors did not move quite as well, 5 dozen remaining on hand. These would cover the expected increase in business, so an order was placed for 15 dozen, the same as in 1905.

SNELL MFG. COMPANY, Fiskdale, Mass., has just completed a large addition to its plant for the manufacture of the Irwin Pattern Augers and Bits, and is now working a complete force on this line and finishing large quantities of the goods daily. John H. Graham & Co., 113 Chambers street, New York, are sole agents for the company, and will be pleased to send samples and make quotations on this line.

J. L. MOTT IRON WORKS' NEW BUILDING.

THE J. L. MOTT IRON WORKS, for a long term of years located at 84-90 Beekman street, New York, has just moved into their own handsome new 12 story building on a site 50 x 105 feet at the northwestern corner of Fifth avenue and Seventeenth street. The company occupies the entire building, which admirably meets the necessities and requirements of the many branches of the business. No stock is carried save a few parts or repairs that may be wanted quickly. The basement is fitted up as an especially fine show room for the display of plumbing and sanitary fixtures, divided into tiled compartments or rooms for the proper installation of bathroom and other requisites. The second and third floors are also assigned to the proper handling of the plumbing line. The fourth floor contains the quarters of the executive officers and managers of the company, the fifth floor having the financial offices and bookkeeping and clerical force.

The sixth floor, built with an especially high ceiling, is devoted to the display of ornamental iron work, including statuary fountains, electric light and other columns, stable fittings and kindred articles of a large line of such goods, this department being in charge of C. A. Peck. The seventh floor contains the hot water and steam heating goods, which are an important feature of the business. The eighth floor is used entirely for displaying stoves, heating and cooking outfits of various kinds, furnaces, &c., the business when established in 1828 having to do with this line alone. The ninth floor in addition to other uses will contain the janitor's apartments and the tenth floor will be used for all kinds of designing and drafting and architectural work. On the eleventh or top floor the trade literature of the company is handled. Here an adequate supply of catalogues, circulars, &c., are kept and replenished from a separate storehouse uptown as occasion demands, all the mailing and circularising being done in this department. Here also electrotypes, wood cuts and everything of like character pertaining to catalogue work and printing are kept. A large part of the space is especially fitted up for photographing, there being a large photographer's skylight and three fine dark rooms for the use of the company's own specialists.

It will be recalled that the entire manufacturing plant of this company, formerly at Mott Haven, in suburban New York, has recently been removed to entirely new works at Trenton, N. J., costing over a million dollars, the work of moving having extended over a large part of the current year.

NATIONAL BELL FOUNDRY COMPANY, Cincinnati, Ohio, is distributing a booklet referring to its Cast Steel Church and School Bells, which contains besides price-list much information of value to those purchasing bells, together with numerous testimonial letters. In connection with its printed matter the company is also sending out a bill file in the shape of a bell bearing the legend, "Write your letter when angry, but don't mail it till next day." This, it is stated, should not be applied to orders for the company's Bells.

A NEW composition for cutlery handles has been adopted by the Hart Mfg. Company, Unionville, Conn. It is called Near Rubber, and is the invention of H. C. Hart, the Hart Mfg. Company being sole owner of it. The new composition will be used on scale tang and solid handle goods. It is said that it can be made much cheaper than rubber, and that it cannot be cracked or split in hafting.

THE T. C. PROUTY COMPANY, LIMITED, Albion, Mich., manufacturer of Parlor and Barn Door Hangers and Hardware Specialties, is sending to the trade a useful vest-pocket memorandum book, bound in imitation Morocco leather and having gilt edges. This little souvenir had been intended for distribution at convention assemblies, and a card insert bears the words "It is better late than never."

THE NEAL & BRINKER COMPANY'S SYSTEM OF HANDLING ORDERS.

THE NEAL & BRINKER COMPANY, whose hardware store, located at 18 Warren street, New York, was described at some length in a series of articles recently appearing in *The Iron Age*, has a careful and systematic method of handling and filling orders. All orders received, whether secured by outside salesmen or taken in the store, are written up on sales sheets similar to those employed by many hardware concerns. In the accompanying illustration, Fig. 1, a portion of a sales sheet is reproduced, showing how it appears after an order has gone through the house and all necessary entries, time stamps, &c., have been properly made. By these time stamps

It Is Possible to Trace Any Order,

following its course accurately from one department to another, so as to locate and inquire into any undue delays.

Immediately on receipt every order is registered; that is, it is given a serial number which is stamped after REGISTER NO. on the sales sheet. The first part of the number indicates the date and the second the numerical position of the order on that date, a new series being started for each day's orders, beginning with number 1. Thus, the register number 7-5-39 on the order illustrated, indicates that it is order number 39 received on the 5th day of the 7th month, July 5th. The time when the order came in is shown by the dial time stamp under DATE REC'D, the date appearing in the center of the stamp and the exact hour being indicated by the position of the triangular spot outside the dial.

The Order Next Goes

to the stock department to be filled, being time stamped under RECEIVED STOCK DEPT., as shown in the cut. Here the various items are first gone over by the department head to see if they call for anything that cannot be supplied from stock. Such articles are procured by the city "pick-up" buyer if possible; otherwise they are ordered direct. It should be stated that the third floor of the company's building is occupied by the Builders' Hardware stock, while the fourth floor is given up to Tools. All goods ordered which are included in these two classifications are laid out on their respective floors. To facilitate this work the articles making up different orders are separated by division strips made by nailing two boards together as shown in Fig. 2. Some compartments so formed are permanently allotted to regular customers and labeled as such.

Goods laid out in all parts of the store are assembled in the shipping room in the basement. The receipt of the order sheet at this point is indicated by the time stamp of the shipping department appearing in the illustration. The entries under the packer's initials show just how many boxes, barrels, bundles and crates should come along before the order is ready to go out. In the column of the sheet headed SHIP'G CHECK the V check is put on after the order is laid out by the checker, whose initials appear in the proper space. The line across the V is the shipper's check. After shipment the order is examined by the pricing department, where the time is stamped and then sent up to the accounting department occupying the fifth floor of the building to be billed. The stamp under REC'D BILLING DEPT. indicates the time it reaches this point and another stamp gives the date billed. Bills are typewritten in duplicate, copies being retained in loose leaf binders and amounts only being posted to ledger accounts.

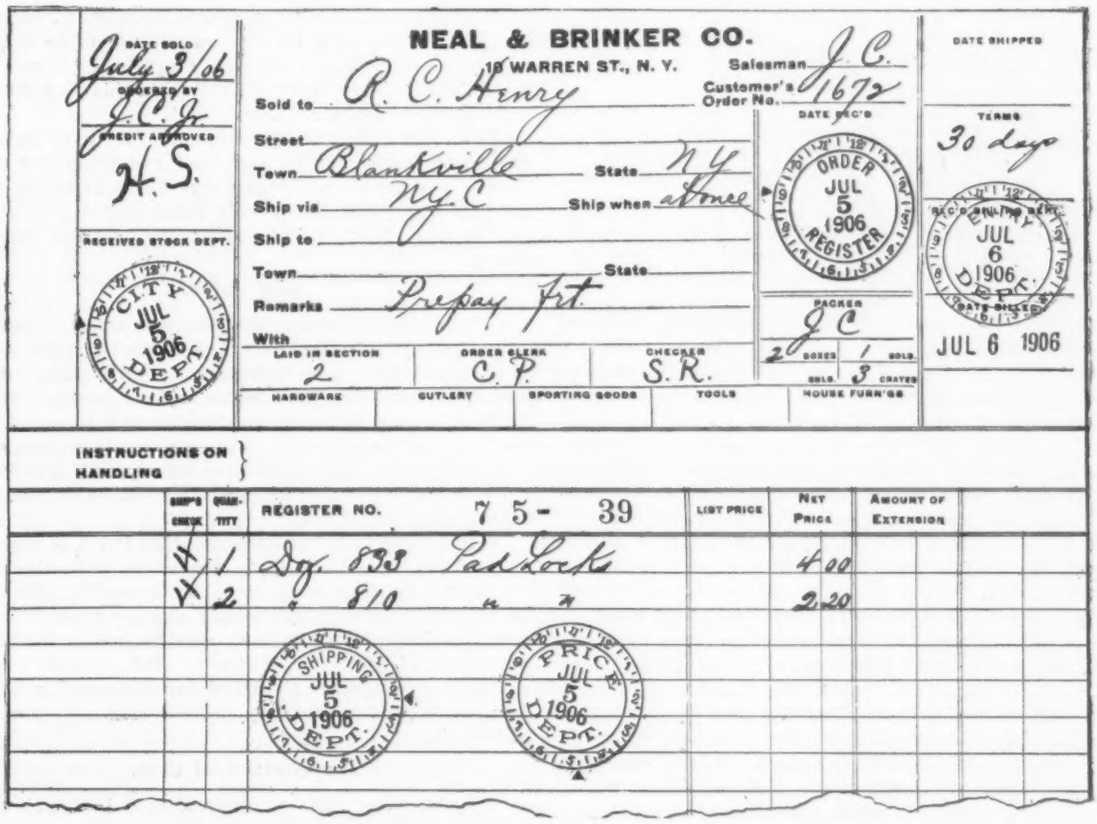

NEAL & BRINKER CO.
18 WARREN ST., N. Y.
DATE SOLD July 3/06
ORDERED BY J.C.J.
CREDIT APPROVED H.S.
Sold to R. C. Henry
Salesman J.C.
Customer's Order No. 1672
Street
Town Blankville State N.Y.
Ship via N.Y.C. Ship when at once
Ship to
Town State
Remarks Prepay frt.
With
RECEIVED STOCK DEPT. CITY JUL 5 1906 DEPT.
DATE REC'D ORDER JUL 5 1906 REGISTER
DATE SHIPPED
TERMS 30 days
REC'D BILLING DEPT. JUL 6 1906 DEPT.
DATE BILLED JUL 6 1906
PACKER JC
LAID IN SECTION 2
ORDER CLERK C.P.
CHECKER S.R.
2 BOXES 1 BDLS. 3 CRATES
HARDWARE CUTLERY SPORTING GOODS TOOLS HOUSE FURN'GS
INSTRUCTIONS ON HANDLING
SHIP'G CHECK
QUANTITY
REGISTER NO. 7 5 - 39
LIST PRICE
NET PRICE
AMOUNT OF EXTENSION
V 1 Dg. 833 Pad Locks 4 00
V 2 " 810 " " 2 20
SHIPPING JUL 5 1906 DEPT.
PRICE JUL 5 1906 DEPT.

Fig. 1.—Sales Sheet, Showing Time Stamps and Other Entries Incident to the Execution of Order.

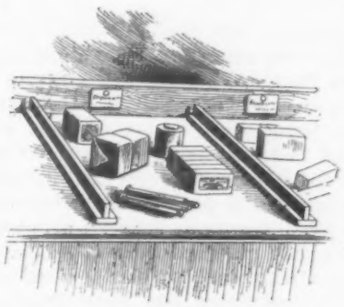


Fig. 2.—Method of Laying Out Goods, Different Orders Being Separated by Division Boards.

Should Any Question Arise

in the store or between the company and its customer regarding the attention received by this order, the following chronology may be gained from the sales sheet on file as reproduced in Fig. 1:

Order received, July 5, 9 a.m.
Turned over to stock department, 9.30 a.m.
Arrived at shipping room, 2 p.m.
Reached price department, 5 p.m.
Received in billing department, July 6, 8.15 a.m.
Date billed, July 6.

THE FEDERATION HARDWARE & TOOL COMPANY.

THE FEDERATION HARDWARE & TOOL COMPANY, 277 Broadway, New York, is a recently organized manufacturing enterprise with an authorized capital of $150,000, divided into 15,000 shares of a par value of $10 each. The company will manufacture and supply specialties in Hardware, such as Locks and Mechanics' Tools, at the same time offering to carpenters and other mechanics opportunities to participate in the profits of such tools as the company produces or furnishes in proportion to the amount of stock owned by the individual. Stock subscriptions are payable partly in cash and the balance, if desired, may be given in labor or services in procuring or influencing sales of the company's products, the details of which are fully explained in a pamphlet just issued. A start has been made with the bringing out of a new style of Cylinder Door Lock, the works of which are operated by means of a spiral steel key, similar to ordinary cylinder lock keys, except for the longitudinal twist in it, which is peculiar to this lock.

The officers of the company are George G. Stephenson, president, long vice-president of the First National Bank, Amenia, N. Y.; Julian A. Hurdle, vice-president and general manager, as well as the inventor of the new lock and for a score of years or more with Charles Morrill, 277 Broadway, New York, manufacturer of Hardware Specialties, and George A. Clement, secretary and treasurer. In addition to those named above is H. A. Heisler, also a director, who is a member of local union No. 227, Brotherhood of Carpenters, Philadelphia, Pa. The National Butchers' & Drovers' Bank, New York, is the depositary of the company's funds.

MOORE & HANDLEY HARDWARE COMPANY'S NEW CATALOGUE.

THE MOORE & HANDLEY HARDWARE COMPANY, Birmingham, Ala., has just issued a compact illustrated catalogue, No. 1, of General Hardware, Factory and Mill Supplies and Machinery. The book is cloth bound and contains 1224 pages, each 6 x 9 in., with 34 columns of index. The line of goods carried in stock is a very large one, and it was not practicable to include them all in the book, but the company can supply them on application. About September 1 the company will vacate the temporary quarters occupied since its fire, November 7 last, and take possession of the new and commodious building since erected at the corner of Twentieth street and Avenue A, thereby enabling it to handle its steadily growing business with greater facility than ever before. An entire floor, 82½ x 150 ft., will be used to display samples of the stock and facilitate selections by customers, and visits from all the company's customers and friends are cordially invited.

C. E. Lewellen has purchased the store of Williams Bros., in Weaubleau, Mo., and will handle Shelf Hardware, Stoves, Tinware, Paints and Oils.

Arnoldy & Dieboldt have succeeded to the business of John Dieboldt, in Olpe, Kan. They will carry Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting and Athletic Goods.

EVERYDAY PAINT.

A paper written by C. B. Heckel, secretary of the Paint Grinders' Association of America, and read at the recent meeting of the Michigan Retail Hardware Association.

MOST of you are dealers in Paint, and in so far as you are active in the missionary work of extending the sale of Paint and encouraging among the people what I call the "painting habit," you are entitled to rank among the benefactors and civilizers of mankind.

The average property owner, unfortunately, is prone to regard Paint as a luxury—an expense to be avoided as long as possible and to be cut down to the lowest possible limit. In the light of cold facts this is a strange attitude—a perverse attitude.

There are Paints and Paints, it is true; some Paint is very good, some may be very poor and some just passable, but I assert boldly that any Paint is better than no Paint, and that the poorest Paint that can be found on the market will pay better in the long run than no Paint.

Good Paint.

What is good Paint? That depends largely upon the purpose for which the Paint is to be used and the conditions of service. Good Paint for a dwelling might be a very poor Paint for a steel bridge or for a corrugated iron building. Good Paint for the interior of a house may be inefficient on the exterior. Good carriage Paint may be a poor floor Paint. So you see that before deciding whether a Paint is good or bad we must know for what use it is intended.

Again, it must not be forgotten that Paint is required to perform two offices: first, it must be protective, and secondly it must, in many cases, be decorative. The two offices are not always compatible, and the reasonable demand for beauty must in most cases be met by sacrificing something of protective efficiency. Still another consideration that confronts the Paint manufacturer in his efforts to meet the everyday demand with an everyday product is

The Question of Cost.

If price were not in question, gold leaf makes an efficient protective coating, and similarly the plan tried in the Pennsylvania Railroad Station at Jersey City of applying sheets of paraffine paper over the steel girders before painting them gave excellent results. Apropos to this phase of the question, I have been informed of a recent experience of the same company in which the Paint on two bridges proved to be about equally satisfactory after three years and both superior to anything else used on the road. But one was a varnish Paint, costing about $2 a gallon, and the other a combination of zinc, lead and iron oxides ground in linseed oil and petroleum, costing $1 a gallon or less. Other things being equal, it is obvious that the cheaper Paint is preferable.

Difference of Opinion.

After the smoke of controversy has cleared away and the confusing din of competition has been silenced, in our consideration one fact stands forth clear as day: honest and competent authorities are not yet agreed as to what constitutes the best Paint, or, to put it in a more practical form, the most desirable Paint for any given use. If it were otherwise such large consumers as the great railroad systems, which have at their command a high grade of technical intelligence, would necessarily approach one another in the range of their specifications. As a matter of fact it is often found that two divisions of the same road are in absolute conflict in their demands; while in the departments of the U. S. Government every Paint chemist and every supervising architect is a law unto himself.

While Approved Paints May Differ Widely in Composition,

the real struggle for supremacy to-day is between the old form of paste Paints in oil (commonly known as lead in oil and tinting colors) and Paints ready for use (prepared

or ready mixed Paints). The painters, as a class, are all on the side of the old style Paint, for obvious reasons. But the everyday Paint consumer is largely on the side of the modern Paint, also for obvious reasons.

Hand Made vs. Machine Made Paints.

Without going deeply into the details of this controversy, let us glance for a moment at some of its salient points: With the old style paste Paint the painter buys the materials in the open market and mixes them by hand for the job. The materials professedly used by him are lead in oil, tinting colors, linseed oil, turpentine and Japan dryers—though it is quite easy for him to substitute for his lead in oil a combination lead; for a part of his linseed oil, rosin oil, fusel oil, petroleum or a water emulsion; and for his turpentine, benzine or gasoline. But assuming that he buys what he regards as the best materials, his lead in oil may be poor in quality, his tinting colors of a low grade, his linseed oil and turpentine grossly adulterated, and his Japan dryer largely benzine and rosin. Even setting aside the probability of adulteration, the wastefulness of piece-meal hand labor and the costliness of purchases in what amounts to retail quantities, we come to the demonstrable fact that a hand made mixture is neither so uniform nor so complete as a machine made mixture, and that the painter is essentially an artisan with the prejudices and limitations of his craft. He cannot know, as the Paint specialist knows, the properties of materials and their sodifying reactions on one another.

The Paint manufacturer, on the other hand, must "make good"—his success depends upon it. Though he had all the will in the world to make bad Paint the requirements of his business force him to make Paint that will meet the conditions of actual service—not here or there, but everywhere; not to-day or to-morrow, but every day—he must make everyday Paint or he will soon be driven out of business by his more enterprising competitors.

There is a line to be drawn, surely, between the manufacturer who honestly endeavors to give the highest Paint value—that is, beauty, protection and durability—for the price paid, and the manufacturer who endeavors to produce his goods at the lowest and sell them at the highest price; but usually the line draws itself very promptly in the record made by the Paints themselves.

Legislative Attempt to Fix Standards.

Incidentally it seems to me that the most serious propositions at present confronting the sellers of Paint are, first, the tendency of country legislators to fix standards where standards are in the nature of the thing unfixable; and, secondly, the competition of the mail order or catalogue houses, which profess to save money to the consumer by dispensing with the middlemen. No fair minded Paint manufacturer would object to conservative Paint legislation, confined as it should be to the abolition of misrepresentation and misbranding; but the sort of arbitration which arbitrarily attempts to set standards of quality must eventually tend to reduce Paint to the level of a commodity like salt, sugar or flour, and drive its manufacture into the hands of trusts. It is the good will attaching to favorite brands that makes the Paint business profitable to you, and incidentally guarantees steady improvement to the consumer. Let the laws once set their seal of approval on certain ingredients or combinations of ingredients and of disapproval on the rest and the margin will disappear from the Paint selling business as it has from the selling of Wire Nails, while the competition which constantly tends to make Paint better and cheaper will cease.

I did not intend to introduce the subject of legislation in this paper, but now that I have mentioned it let me direct your attention to the peculiar fact that all such legislation in this country has had for its immediate purpose the protection of the consumer who wishes to buy pure white lead, while Paint legislation in several foreign countries, notably France, Belgium and Switzerland, has been confined to the protection of the public against lead products on the ground that they are extremely poisonous and therefore subject to sanitary restriction.

Mail Order House Paint.

The mail order house is the second great menace to the Paint trade. In speaking of this evil I shall have to quote myself. Writing to a trade paper regarding it I recently said:

> The mail order house is far away and impersonal. Its only agents are catalogues, circulars and advertisements, which can neither sue nor be sued. There are few rural purchasers who have the enterprise, the knowledge or the money to bring suit for recovery against a corporation in a foreign State, and therefore it is safe as a general thing to claim everything and take the chances. After sifting it all down to hard nails, the only sound basis for the faith necessary to judicious selection of Paint is the reputation of the manufacturer—not his financial standing, for financial responsibility is no gauge of verbal accuracy—the reputation of the manufacturer for making good Paint and for "making good." Added to this, the known standing of the local dealer who is accessible when anything goes wrong and to whom the manufacturer of the goods is directly responsible in like cases.

Finally, it is worth your consideration as Paint dealers that State Paint laws can have but little control over catalogue house Paint when it appears under the guise of interstate commerce.

The First Requisite to Successful Paint Selling

is, of course, to have a good brand of Paint for sale; not necessarily a "pure" Paint or an "unadulterated" Paint, but just a good everyday Paint—one that will give the buyer his money's worth in spreading capacity, beauty, protective efficiency and durability—in short, a Paint that will justify the eloquence in pushing it. Having secured a Paint of this class, all the work of pushing it should not be left to the manufacturer. You are on the ground, you know where Paint is needed and when, and you know the people who need it. All the advantages of the "inside track" are yours, and if you do not sell increasing quantities of Paint, using one successful job as an argument to secure another, you are neglecting opportunities for which the manufacturer himself would give much.

Convenient, Economical, Efficient.

The argument, too, is all on the side of the ready mixed Paint seller—ready mixed Paint is convenient, it is modern, it is economical, it is efficient; and of all this it is easy to convince the consumer if you will study the subject and equip yourselves to present it properly. I have nothing to say against White Lead—it has been in use for several centuries, and despite some serious drawbacks we need it in our business. What I do insist, voicing the consensus of expert opinion, is that it is but one pigment among many, and that while it has its proper place—a very important place—it is not the "whole show" and gives better results when combined with other pigments in a properly balanced ready Mixed Paint than when employed alone and prepared for use by the common rule of thumb Paint shop practice. Besides—and this is a personal point for you—there is no profit in it.

An Important Industry.

The manufacture of Paints ready for the brush began about 1860; to-day the output is somewhere between 60,000,000 and 100,000,000 gal. yearly. Enormous capital has been invested in the industry, and the best technical knowledge and skill obtainable is employed in manufacturing and producing the product. Special situations and special ends require special Paints, but for the requirements of the every-day property owner—the man with a house or a barn or a fence or a buggy to paint—this diverse material which I have denominated "Every-day Paint" is most adequate and most satisfactory.

W. A. GUENTHER & SONS, Owensboro, Ky., has just purchased a building, 50 x 130 ft, four stories high, which will be enlarged so as to make it 114 x 130 feet. When this is done and the building fully equipped the company will take possession with its wholesale stock and operate on an exclusive jobbing basis. The company's business has outgrown the present quarters and this material expansion of its facilities has been imperatively demanded.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM COOK-ROGERS HARDWARE COMPANY, Eutaw, Ala., wholesale and retail Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting Goods, &c. The company has lately been incorporated with a capital of $25,000.

FROM ARTHUR S. TUCKER, who has purchased the retail business of Seth Wetherbee in Warren, Mass., and will carry a line of Shelf Hardware, Stoves, Tinware, Agricultural Implements, Paints and Oils.

FROM PRESBREY-MASON COMPANY, Taunton, Mass. The company handles Shelf and Heavy Hardware, Agricultural Implements, Paints, Oils, Sporting and Athletic Goods, Mill Supplies, Gas and Electric Supplies. Ernest Mason has recently retired from the company, but the business continues under the same style.

FROM MITCHELL MERCANTILE COMPANY, which has purchased the business of C. F. Johnson, in Mitchell, Neb. The company will conduct both a wholesale and retail business in Shelf Hardware, Stoves and Tinware, Agricultural Implements, Paints, Oils, Sporting and Athletic Goods.

FROM THE ALICE MERCANTILE COMPANY, Alice, Texas, incorporated with a capital stock of $20,000. The company handles at retail Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting Goods, Lumber, Sash and Doors, Furniture, Wagons and Buggies.

FROM LEE A. JOHNSON & Co., who have lately opened a General Hardware store at Outlook, Wash., this being a branch of the main establishment at Sunnyside.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our catalogue department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

H. W. JOHNS-MANVILLE COMPANY, 100 William street, New York: Illustrated descriptive catalogue of the Manville Fire Extinguisher.

MCSHANE BELL FOUNDRY COMPANY, Baltimore, Md.: Catalogue relating to Church Bells, Chimes and Peals, and Bells of all sizes for fire alarms, court houses, tower clocks, &c.

THE HARRIMAN MFG. COMPANY, Harriman, Tenn.: Catalogue C devoted to Plows, Plow Stocks, Cotton Planters, Harrows, Steel Shapes, &c.

CAMERON STOVE COMPANY, Richmond, Va.: Catalogue of Cameron Steel Ranges and Air Tight Heaters.

Ingle & Berry, Shelbyville, Tenn., will about November 15 remove to a two-story brick building, 30 x 100 ft., recently purchased. The building will be thoroughly refitted to adapt it to the requirements of the Hardware business.

The Hardware & Supply Company, Bridgeport, Conn., has been incorporated with a capital stock of $10,000, of which $6000 has been paid up. A retail business will be carried on, including Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Factory Supplies, &c.

Correspondence.

"2 Off 10 Days."

To the Editor: I was glad to read Mr. Brownell's communication in your issue of the 9th inst., as I find this matter of cash discount is very much abused by the trade. Very few people seem to be aware of the real meaning of these terms, or else do not care to observe them to the letter, and take all kinds of liberties with the time, even taking 60 days, and then discounting. As Mr. Brownell says, the time was when prices were such as to allow people to take off this discount of 2 per cent. after the time had expired and still permit the manufacturer to make good money, but with the very sharp competition that day has gone by.

It is strange how many people avoid living up to the terms of shipment by offering some such trifling excuse as "The goods did not arrive," or "We could not check up your invoice until to-day," or "The vessel did not sail as soon as expected," or "The goods were damaged in shipment," or "They were lost on the way and we wanted to see the goods before paying, &c."

Then there is another class of business men who never think of paying until you draw on them, and have the draft returned, saying, "Will send check; never pay sight drafts," and after some weeks let you send it to your collector.

Why not sell all goods on 10 days' time, and if the purchaser takes 20 or 30 or 60 days charge him at the rate of 6 per cent. for all time after 10 days. In the majority of cases in these days of quick shipping the goods arrive in 10 days, and if they do not arrive, and this should be the fault of the sellers, they are responsible and are only too glad to make fair and honest adjustment.

If a merchant's credit is good at home (and if not at home it is not away from home) he can get his loans at 6 per cent. at least, and pay his bills at a discount of 36 per cent. Why not make this large profit? Nine-tenths of the manufacturers and jobbers would be glad to have the trade take the net time allowed on invoices, and not discount, as it would make a greater percentage of profit than they receive on the goods when discounted. If in want of money a great many of them can get it at 4 and 5 per cent. from the banks. We should like to hear from others on this important subject. A MANUFACTURER.

LOYALTY OF EMPLOYEES.

THE RICHARDS MFG. COMPANY, Aurora, Ill., has issued for general circulation to the trade a tastefully printed hanger in which the following from Elbert Hubbard's pen is given appropriate lettering:

> If you work for a man, in heaven's name work for him. If he pays you wages which supply you your bread and butter, work for him, speak well of him, think well of him, stand by him, and stand by the institution he represents.
>
> I think if I worked for a man I *would* work for him. I would not work for him a part of *his* time but *all of his time*, I would give him an undivided service or none.
>
> If put to a pinch an ounce of loyalty is worth a pound of cleverness.
>
> If you must vilify, condemn and eternally discourage, why, resign your position, and when you are outside *damn* to your heart's content. But I pray you, so long as you are a part of an institution do not condemn it. Not that you will injure the institution, not that, but when you disparage the concern of which you are a part you disparage yourself.

MISCELLANEOUS NOTES.

The Savory Roaster.

The Republic Metalware Company, Buffalo, N. Y., gave a practical demonstration of its Savory roaster at the recent House Furnishing Goods Exhibition, held at Madison Square Garden, New York, beef, lamb and other meats cooked in the roaster being served daily to visitors. The company's principal claim for the roaster is the

delicious, sweet, meaty flavor and tenderness that it gives a roast, even of ordinary quality. This year the output of the roasters will be more than double that of last year, owing to the steadily growing popularity of the utensil.

Nassau Oil Soap.

Nassau Oil Company, Oyster Bay, Long Island, N. Y., is offering Nassau oil soap, which is described as made from pure new vegetable oils, not a particle of animal fat entering into it. It is antiseptic and in substance closely resembles vaseline. The oil soap is intended for general cleansing purposes, special reference being made to its desirability for the automobile or carriage; for clothing and heavy fabrics; for silk, laces, etc.; for marble, tiling, granite, hard wood finishing, furniture and highly polished surfaces, windows, mirrors, glassware, &c. It is stated that the soap will not injure the most highly finished surfaces, but instead adds luster and beauty, while it is especially efficient in cleaning delicate fabrics, woolens or carpets. The soap can be used in hard or soft water. In addition to its purity the company lays emphasis on the economy secured by its use, a little of it going far. The soap is put up in tin cans up to one pound; in wooden pails, 5, 10, 15 and 25 pounds; in kits or tubs, 70 to 100 pounds, and in half barrels and barrels.

Nassau Oil Soap.

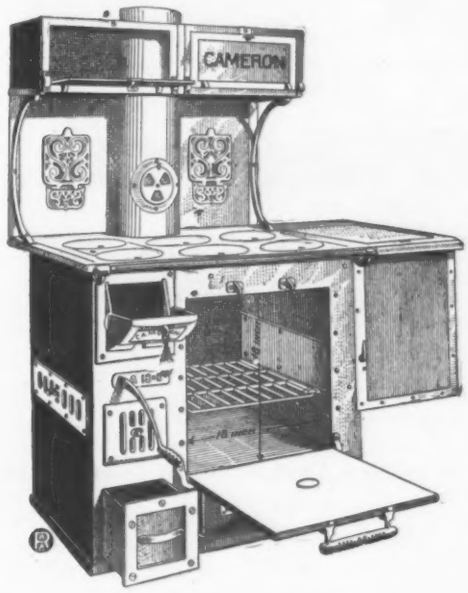
The Perfecto Roller Razor Strop.

The accompanying cuts represent an automatic roller razor strop, open and closed, put on the market by the Perfecto Mfg. Company, Towanda, Pa. The substantial case is of polished wood and enameled steel. The leather is especially tanned for the manufacturer by the "Hemoak" process, with satin finish to insure a high class strop of superior sharpening qualities. The case prevents dust and dirt settling on the leather, keeps the leather from becoming dry, and makes the strop convenient for use at home and when traveling. Each strop is packed in a paper box; six boxes in a carton, 24 cartons or 1 gross strops in a case.

The Perfecto Roller Razor Strop.

Cameron Steel Range.

Cameron Stove Company, Richmond, Va., is putting on the market the new steel range shown in the accompanying cut. The company states that all ranges are made of the highest grade steel, patent levelled, with first-class castings throughout, the pig iron being mixed with a patented compound, so that the castings will stand great heat. Nickeled parts are heavily coated, and nickel and steel work is protected from rust by a patented paraffine coating. In design, the range is said to embody some radical departures from old ideas, and the company calls attention to the following features: Extra large ovens, 18 in. wide by 18 in. high and 21 in. deep, giving increased baking capacity without increasing the size of the range or the consumption of coal; extra large flues, all 4 in. deep, giving good draft, so that ranges are guaranteed to burn hard coal, soft coal or wood with equal economy; flue clean out door 9 in. long by 3 in. wide; heavy bar steel braces on oven door; rolled steel top frame ¼ in. thick; all grates, liners, tops, &c., interchangeable on all sizes and styles. The company also refers favorably to its location and railroad connections, giving especial facilities for shipments to Southern points.

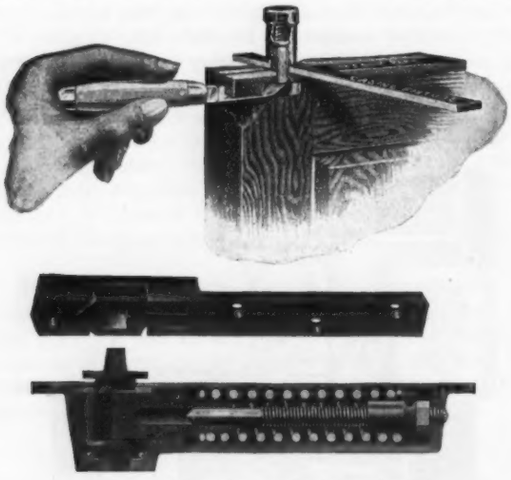


Cameron Steel Range.

Improved Columbian Floor Spring Hinge.

The Columbian Hardware Company, Cleveland, Ohio, with a branch office at 168 Church street, New York, has improved its floor spring hinge, which was illustrated in these columns January 13 last. The improvement consists of an alignment adjuster, which is referred to as very simple and practical. The accompanying cut illustrates the hinge with the adjuster shown above. The adjuster is made of malleable iron and consists of two castings, and with the aid of two small screws located in the side, the door can be thrown into line. If through carelessness upon the part of the carpenter the door does not hang at right angles, it may be quickly adjusted to hang perfectly true. The door can be taken down by

turning it at an angle with the casing, and inserting a knife blade or nail in the slot of the fixture on the top of the door and pushing up the pivot which is held in place by a spring. The door can then be removed, the whole operation taking less than a minute, without disturbing the tension on the spring or removing any parts from the door. The tension of the spring can also be adjusted without removing the door.



Improved Columbian Floor Spring Hinge.

The Star 20th Century Barn Door Hanger.

Hunt, Helm, Ferris & Co., Harvard, Ill., are putting on the market the barn door hanger made to run on a round rail, shown in the accompanying illustrations. In Fig. 1 both front and side views of the hanger are given. It is roller bearing, made of one piece of malleable iron, and is fitted with a lug, so that it cannot run off the rail. The hanger is finished in aluminum, with the lettering touched up in red, and is referred to as a handsome hanger and one capable of sustaining the heaviest doors. The round rail is completely closed, and is furnished in 2-ft. sections. The manufacturers call attention to the superiority of this form of rail in that it can be put up with half the labor required with longer sections, as only one 2-ft. section and one bracket go up at a time; that as the bracket can turn on the splice there is no warping of the rail when put on the barn; that any length of door can be fitted with 2-ft. sections of the rail, so that it is not necessary to buy different lengths of rail for different sized doors, and consequently it is unnecessary for merchants to carry rail of more than one length in stock; that it requires one-fifth of the room to store and can be kept in a box under the counter, if desired; that there is no shortage in shipping, as it can be packed in a box complete with brackets; that the shape of the rail keeps the hangers from binding on the track and gives them the required flexibility; that the rail being closed it is stiffer and no water can get in and rust it; that the rail is guaranteed as strong at the splice as at any other place, and that the splice is the same diameter as the rail, and causes no jar as the hanger passes over the splice. The hanger is sold on the exclusive agency plan.

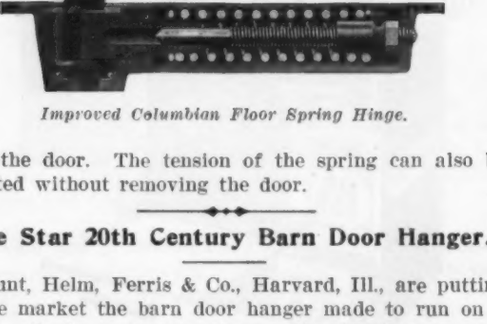


Fig. 1.—The Star 20th Century Barn Door Hanger.

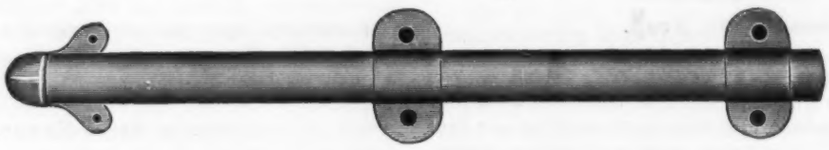


Fig. 2.—Star 20th Century Hanger Rail.

Clark's Huskers.

Among the 51 styles of pins, hooks and bands, manufactured by R. F. Clark, 100 Lake street, Chicago, Ill., are the corn huskers shown in the accompanying cuts. In Fig. 1 an improvement for this year is illustrated, this being a new wristband all in one piece. The portion of the soft steel plate which is bent into the palm has a corresponding part bent over the thumb, while the narrow part of the plate forms over the lower part of the hand, and can be bent to fit any hand. The part of the plate passing over the wrist serves as a brace and acts as a purchase for the hook. A strap passes under the thumb to tighten the entire plate and make it cling, and to bear the strain of the hook without causing any unusual stress in one place more than another, and thus avoiding chafing. The strap lacing, after passing under the thumb, passes twice through one ring and ties the sinch in going back to another ring. The hook is attached by a screw which passes through the plate, and

Fig. 1.—Corn King Hook No. A. B.

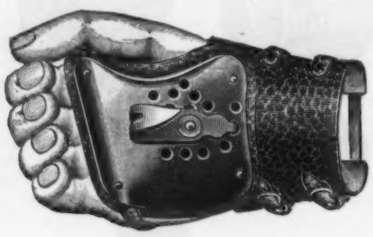


Fig. 2.—Palm No. C.

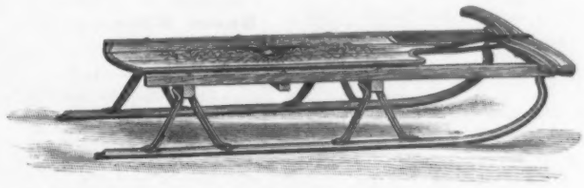
can be changed to any of the five holes in the plate, so that it can be set at any angle in each hole, and with the one hook every hook position may be obtained. The palm, shown in Fig. 2, has 15 holes to set the hook. The

Fig. 3.—Standard No. E.

palm has a thumb strap and a hand strap. The standard E, Fig. 3, is a new plate with a breaker shield on the under side of the palm for husking at the shock.

The Flexible Flyer Sleds for 1906.

The flexible flyer sleds, manufactured by S. L. Allen & Co., Philadelphia, Pa., will be improved in construction for the season of 1906, as shown in the accompanying illustration. Two new patents have been taken out. Under the first patent the face of the runner will be made hollow in the center and flat on the sides. This shape is to



The Flexible Flyer Sleds for 1906.

enable the sled to run well through snow or ice. The runner is not hollow enough to interfere with the sled while on snow, but is hollow enough to make it steer much better under all conditions, especially on ice. The second patent covers a new design for runners of all sizes, and is referred to as a greater improvement than the first. Instead of a gradual grade of runner to the cross bar, it will start from the level with just as easy lines, but with a new curve, increasing in abruptness as it gets higher, and ending in a goose neck. This lengthens the bearing and steering surfaces materially, thus securing better results both in speed and in control of the sled. The manufacturers, in order to help the dealers, will distribute gratis this year 500,000 cardboard models of their sleds, as well as a million of Flexible Flyer envelopes in addition to an aggressive advertising campaign in the leading magazines and newspapers of the country, having a combined circulation of 25,000,000 copies.

The Ideal Cistern Pump.

The Ideal Pump Company, Sabina, Ohio, is offering the cistern pump here shown. The pump, which is made of 26-gauge galvanized iron, will not freeze up because it has a discharge below the piston, which allows the water to flow back to the water line in the cistern. It does not have to be primed, as it has a submerged piston and valve so constructed that they allow all obstructions to pass without causing the pump to leak. The pump produces a flow of water rapidly, and with great ease, as it is an antivacuum (atmospheric pressure does not have to be expelled in order to start a flow of water) and not a suction pump. It is pointed out that because the tubing is of the same size the entire length of the pump, and as the inlet portage is of the same size as the flow in the tubing, the pump works easily. The pump is made any length up to 20 ft., a 10-ft. pump pump weighing 10 lb.

The Ideal Cistern Pump.

HARPER & MCINTYRE COMPANY, wholesale Hardware, Ottumwa, Iowa, has lately distributed a loose leaf catalogue covering the different lines of goods handled by the company. It is a handsome volume and contains more than 1400 pages.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—	℔ gal
Linseed, City, raw	.38 @39
City, Boiled	.40 @41
State and Western, raw	.37 @38
Raw Calcutta Seed	.68 @..
Lard, Extra Prime, Winter	.69 @70
Extra No. 1	.46 @47
No. 1	.40 @44
Cotton-seed, Crude, f.o.b. mills	@22½
Summer Yellow, Prime	36½@..
Summer Yellow, off grades	@..
Sperm, Crude	.53 @..
Natural Spring	@..
Bleached Spring	@..
Natural Winter	.63 @65
Bleached Winter	.66 @67
Bleached Winter, Extra	.68 @69
Tallow, Prime	.51 @53
Whale, Crude	.32 @33
Natural Winter	.43 @44
Bleached Winter	.45 @46
Extra Bleached Winter	.47 @48
Menhaden, Brown, Strained	.26 @29
Light, Strained	.27 @30
Bleached, Winter	@..
Extra Bleached, Winter	@..
Southern	@..
Cocoanut, Ceylon ℔	7⅜@ 7½
Cochin ℔	8¼@ 8½
Cod, Domestic, Prime	.30 @33
Newfoundland	.35 @37
Red, Elaine	.37 @42
Red, Saponified ℔	4¾@ 5
Olive, Italian, bbls	.52 @56
Neatsfoot, Prime	.48 @49
Palm, Logos ℔	6¼@..

Mineral Oils—	
Black, 29 gravity, 25@30 cold test	℔ gal. 11¼@11½
29 gravity, 15 cold test	11½@12½
Summer	10¼@11½
Cylinder, light filtered	.18 @19
Dark filtered	.16 @17
Paraffine, 903-907 gravity	13¼@14
903 gravity	12½@13
883 gravity	10¼@10⅝
Red	12¼@14

Miscellaneous—	
Barytes:	
White, Foreign ℔ ton	$17.50@19.00
Amer. floated ℔ ton	19.00@.....
Off color, No. 2 ℔ ton	13.50@15.00
Chalk, in bulk ℔ ton	3.00@ 3.25
In bbls ℔ 100 lb	....@ .35
China Clay, English ℔ ton	11.00@17.00
Cobalt, Oxide ℔ 100 lb	2.50@ 2.60
Whiting, Common ℔ 100 lb	.43@ .48
Gilders ℔ 100 lb	.50@ .55
Ex. Gilders ℔ 100 lb	.55@ .60

Putty, Commercial— ℔ 100 lb	
In bladders	$1.70 @1.85
In bbls. or tubs	1.30 @1.40
In 1 lb to 5 lb cans	2.65 @2.95
In 12½ to 50 lb cans	1.50 @1.90

Spirits Turpentine— ℔ gal.	
In Oil bbls	63½@64
In machine bbls	64 @64½

Glue—	℔ lb
Cabinet	.11 @15
Common Bone	.7 @ 9
Extra White	.18 @24
Foot Stock, White	.11 @14
Foot Stock, Brown	.8 @11
German Hide	.12 @18
French	.10 @40
Irish	.13 @16
Low Grade	.9 @12
Medium White	.14 @17

Gum Shellac—	℔ lb
Bleached Commercial	.45 @47
Bone Dried	.55 @57
Button	.40 @50
Diamond I	.54 @55
Fine Orange	.50 @52
A. C. Garnet	@40
G. A. L. Garnet	.44 @44½
D. C	.58 @60
Octagon B	@52
T. N	.47½@50
V. S. O	@55

Colors in Oil—	℔ lb
Black, Lampblack	.12 @14
Blue, Chinese	.36 @46
Blue, Prussian	.32 @36
Blue, Ultramarine	.13 @16
Brown, Vandyke	.11 @14
Green, Chrome	.12 @16
Green, Paris	@24
Sienna, Raw	.12 @15
Sienna, Burnt	.12 @15
Umber, Raw	.11 @14
Umber, Burnt	.11 @14

White Lead, Zinc, &c.—	℔ lb
Lead, English white, in Oil	9½@ 9¾
Lead, American white, in Oil:	
Lots of 500 lb or over	@ 7¼
Lots less than 500 lb	@ 7¾
In Barrels	@ 6¾
Lead, White, in oil, 25 lb tin pails, add to keg price	@ ½
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 lb assorted tins, add to keg price	@ 1½
Lead, American. Terms: For lots 12 tons and over ¼ c rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.	℔ lb
Lead, White, Dry, in bbls	6½@ 6¾
Zinc, American, dry	5⅝@ 5½
Zinc, French:	
Antwerp, Red Seal, dry	8¾
Antwerp, Green Seal, dry	10¼
Paris, Red Seal, dry	9¼
Paris, Green Seal, dry	10½
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over	12¾@13¼
Lots of less than 1 ton	12¾@13⅜
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over	11⅝@11⅞
Lots of less than 1 ton	11⅝@12¼
Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.	

Dry Colors—	℔ lb
Black, Carbon	.5 @10
Black Drop, American	.4 @ 6
Black Drop, English	.5 @15
Black, Ivory	.16 @20
Lamp, Com	4½@ 6
Blue, Celestial	.4 @ 6
Blue, Chinese	.29 @32
Blue, Prussian	.27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.00@3.10
Green, Chrome, ordinary	3½@ 6
Green, Chrome, pure	.17 @25
Lead, Red, bbls., ½ bbls. and kegs:	
Lots 500 lb or over	@ 7¼
Lots less than 500 lb	@ 7¾
Litharge, American, bbls	@ 7¼
Ocher, American ℔ ton	$8.50@16.00
American Golden	2½@ 3½
French	1¼@ 2½
Foreign Golden	3 @ 4
Orange Mineral, English	.10 @12
French	10¾@12
German	8½@10
American	8½@ 8¾
Red, Indian, English	4½@ 8½
American	3 @ 3¾
Red, Turkey, English	4 @10
Red Tuscan, English	7 @10
Red, Venetian, Amer. ℔ 100 lb	$0.50@1.25
English 100 lb	$1.15@1.75
Sienna, Italian, Burnt and Powdered	3 @ 9½
Italian, Raw, Powdered	3 @ 6½
American, Raw	1½@ 2
American Burnt and Pow	1½@ 2
Talc, French ℔ ton	$17.00@25.00
American ℔ ton	17.00@25.00
Terra Alba, French ℔ 100 lb	.90@ 1.00
English ℔ 100 lb	.80@ 1.00
American ℔ 100 lb, No. 1	.75@ .80
American ℔ 100 lb, No. 2	.60@ .65
Umber, Turkey, Bnt. & Pow	2½@ 3½
Turkey, Raw and Powdered	2½@ 3½
Burnt, American	1¼@ 2
Raw, American	1¼@ 2
Yellow Chrome	.12 @14
Vermilion, American Lead	.10 @25
Quicksilver, bulk	.65 @..
Quicksilver, bags	@66
English, Import	.65 @70
Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind

Domestic, ₩ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....33%

Ammunition— See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Eagle Anvils.....₩ lb 7 @7¼¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton .....₩ lb 9½@9¾¢

Imported—

Peter Wright & Sons, ₩ lb, 84 to 349 lb, 11¢; 350 to 600 lb, 11½¢.

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Livingston Nail Co.....33⅓%

Augers and Bits—

Com. Double Spur.....75@75&5%
Jennings' Patn., reg. finish.....50&10@60%
Black Lip or Blued.....60&10%
Boring Mach. Augers.....70&10%
Car Bits, 12-in. twist.....50&10%
Ford's Auger and Car Bits.....40&5%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list..25%
No. 30, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Millers Falls.....50&10&7½%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist....60&10%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's small, $18; large, $36....50&10%
Clark's Pattern, No. 1, ₩ doz. $36; No. 2, $18.....60&10&10%
Ford's, Clark's Pattern.....60%
C. E. Jennings & Co., Steer's Pat...25%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dble. Cut....$3.00@3.24
German Pattern, Nos. 1 to 10, $4.60; 11 to 13, $5.75

Hollow Augers—

Bonney Pat., per doz..$5.50@6.00
Ames .....25&10%
Universal.....20%
Wood's Universal.....25%

Ship Augers and Bits—

Ship Augers.....45&5@—%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts— See *Handles, Mechanics' Tool.*

Awls—

Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered...gro. 65@66¢
Unhandled, Patent..gro. 60@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro. $11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights:
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease—

See *Grease, Axle*

Axles— *Iron or Steel*

Concord, Loose Collar...4¼@4¾¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose...3¾@3¾¢
No. 1½ Com., New Style 3¾@4¼¢
No. 2 Solid Collar.....4@4½¢
Half Patent:
Nos. 7, 8, 11 and 12....75@75&5%
Nos. 13 to 14.....70&10@75&5%
Nos. 15 to 18...75&10@75&10&5%
Nos. 19 to 22...75&10@75&10&5%

Boxes, Axle—

Common and Concord, not turned lb., 4½@5¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb., 8¾@9¢

Bait— Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances— Sash—

Caldwell new list.....50%
Pullman .....50&10@60%

Spring—

Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....50&10%
Straight Balances.....40@50%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars— Crow—

Steel Crowbars, 10 to 40 lb.... per lb., 3¼¢

Towel—

No. 10 Ideal, Nickel Plate..₩ gro. $8.50

Beams, Scale—

Scale Beams.....40&10@50%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₩ doz. $0.85; Tinned $1.00
No. 11 Wire Coppered ₩ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized..₩ doz. $1.75
Western W. G. Co.:
No. 1 Electric.....₩ gro. $7.80
No. 2 Buffalo.....₩ gro. $9.00
No. 3 Perfection Dust.....₩ gro. $8.00

Egg—

Holt-Lyon Co.:
Holt, per doz., No. 1, Jap'd, $1.20; No. 1, Tin'd, $1.50; No. B, Jap'd, $2.00; No. 2, Tin'd, $2.25.
Lyon, Jap'd, per doz., No. 2, $1.25; No. 3, $1.50.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.: T. & S. Dover.....$6.00
Western, W. G. Co., Buffalo.....$7.00
Wonder (R. M. Co.)..₩ gro. net, $6.00

Bellows—

Blacksmith, Standard List.. 60&10@60&10&5%

Hand—

Inch..	6	7	8	9	10
Doz...	$4.75	5.70	6.65	7.60	8.85

Molders—

Inch..	9	10	11	12	14
Doz...	$8.00	9.00	10.50	12.50	14.50

Net Prices.

Bells— Cow—

Ordinary Goods...75&5@75&10&5%
High grade.....70&10@75%
Jersey .....75&10%
Texas Star.....50%

Door—

Abbe's Gong.....45%
Barton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Trip Gong.....50&10@50&10&5%
Yankee Gong.....55%

Hand—

Hand Bells, Polished, Brass.60&10%
White Metal.....60%
Nickel Plated.....50&10@60%
Swiss .....60@60&7½%
Cone's Globe Hand Bells.....33⅓@35%
Silver Chime.....33⅓@35%

Miscellaneous—

Farm Bells.....lb. 24¢
Church and School...50&10@60%
American Tube & Stamping Co. Gongs 15%
Table Call Bells.....50@50&10%

Belting— Leather—

Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard 70%
Light Standard.....70&5%
Cut Leather Lacing.....50%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade)..... 75@75&5%
Common Standard....70@70&10%
Standard .....60&5@60&10%
Extra .....60@60&5%
High Grade.....50&5@50&10%

Bench Stops— See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.
Green River Tire Benders and Upsetters 20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1906 list: Chain, Parts, Spokes.....50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—

Common Wooden....70&10@75%
Hartz St. Tackle Blocks.....50@50&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron.....50%
Stowell's Loading.....50&10%
See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c.....40%
Paper Embossed.....40&10%

Boards, Wash—

See *Washboards.*

Bobs, Plumb—

Keuffel & Esser Co.....33⅓%

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread): ⅜ × 6 and smaller.....75@—%
Larger and Longer..65&5@—%
Phila. Eagle, $3.00 list May 24, '99 80%
Bolt Ends, list Feb. 14, '95.... 65&10@—%
Machine, ⅜ x 4 and smaller 75@—%
Machine, larger and longer.. 65&5@—%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:

Inch.....	3	4	5	6	8
Per doz.	$0.30	.35	.45	.60	.80

Cast Iron Spring Foot, Jap'd:

Inch.....	6	8	10
Per doz.....	$1.20	1.50	2.25

Cast Iron Chain, Flat, Japanned:

Inch.....	6	8	10
Per doz.....	$1.00	1.40	1.65

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch.....	6	8	10
Per doz.....	$0.75	.95	1.25

Wrought Barrel Japd..80@80&10%
Barrel Bronzed.....50@50&10%
Spring .....70&10@70&10&10%
Shutter .....50&5@50&10&5%
Square Neck.....75@75&10%
Square ...66⅔&10@66⅔&10&10%
Ives' Patent Door.....60%

Plow and Stove—

Plow .....65&10@—%
Stove .....82½&10

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Mount Carmel, list Dec. 28, '99...80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—

Borers Tap, Ring, with Handle:				
Inch.....	1¼	1½	1¾	2
Per doz...	$4.80	5.60	6.40	8.00
Inch	2¼		2½	
Per doz.....	$8.65		11.50	

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65@$1.75; No. 3, $2.50 each...25%

Boxes, Mitre—

C. E. Jennings & Co.....30%
Langdon .....15&10%
Perfection 40%
Seavey 33⅓%
Stanley R. & L. Co.: Nos. 240 to 460, 30%; Nos. 50 and 60.....35%

Braces—

Common Ball, American..$1.25@1.30
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60@60&5%
Stanley R. & L. Co.:
Stanley, 35%; Victor.....45%

Brackets—

Wrought Steel...80&10@80&10&5%
Griffin's Pressed Steel.....80@80&10%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf, 75%; Sink...50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods—

See *Wire and Wire Goods.*

Broilers—

Kilbourne Mfg. Co.....75&20%
Western, W. G. Co.....80%
Wire Goods Co.....70@75&10%

Buckets, Galvanized—

Price per dozen.

	Quart.....	10	12	14
Water, Regular...		1.40	1.70	1.90
Water, Heavy....		3.40	3.70	3.80
Fire, Rd. Bottom..		2.30	2.55	2.95
Well		2.55	2.87	3.15

Bucks, Saw—

Hoosier.....₩ gro. $36.00

Bull Rings—See *Rings, Bull*

Butts— Brass—

Wrought, list, Sept., '96..15@—%
Cast Brass, Tiebout's.....50%

Cast Iron—

Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—

Discount.
Reversible and Broad..75&5%
Light Reversible, Light Narrow .....75&10%
Loose Joint, Narrow, L't Inside Blind, etc....75%
Back Flaps, Table, Chest. .....70&10%

Extra, 10&10@—%

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, 5%; 1200, 33⅓%; 200, 300, 600, 900 .....40&10%
Hendryx Bronze: Series 700, 800.... 40&10%
Hendryx Enameled.....40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong....per lb., 4¢@4¼¢
Sharp, 1 prong...per lb., 4¼@4¾¢
Burke's Blunt, 4@4¼¢; Sharp, 4½@4¾¢

Gautier, Blunt, 4@4¼¢; Sharp.4½@4¾¢
Perkins', Blunt, ₱ lb, 3.65¢; Sharp, 4.15¢

Can Openers—
See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.05 each.
New York Pattern	1.50	2.20	2.45 each.
Baltimore Pattern	1.50	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$13.00	60.00	129.60 gro., net.

Caps, Percussion—

Eley's ... B.....52@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket.....per M 62@63¢

Primers—

Berdan Primers, $2 per M...20%
B. L. Caps (Sturtevant Shells) $2 per M.....20%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd.$1.90
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
*Primed Shells and Bullets.*15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed.....70@70&10%
Plate.....60&10@60&10&5%
Philadelphia.....75@75&10%
Acme, Ball Bearing.....33⅓%
Bossa.....70&10%
Bossa Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—
See *Leaders, Cattle.*

Chain, Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	7-16	½	9-16
$3.70	3.90	4.05	4.20	4.05	3.95	3.90

⅝ ¾ ⅞ to 1 1⅛ to 1¼ inch.
$3.85 3.70 3.65 3.80

German Coil.....60&10&10@70%

Halter—

Halter Chains.....60&5@60&10%
German Pattern Halter Chains, list July 2½, '97.....60&10&10%
Covert Mfg. Co.
Halter.....35&5%

Cow Ties—
See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, *Str'ght, with ring*..$25.00
6½—6-2, *Str'ght, with ring*..$26.00
6½—8-2, *Str'ght, with ring*..$30.00
6½—10-2, *Str'ght, with ring*..$35.00

NOTE.—Add 2c per pair for Hooks. Twist Traces; add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.

Eastern Standard Traces, Wagon Chain, &c.....60&10%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60&10%
Brass.....60&10%
Safety Chain.....70&10%
Gal. Pump Chain.....lb. 4@4½¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion.....40%
Oneida Community:
Am. Dog Leads and Kennel Chains, 40@40&5%
Niagara Dog Leads and Kennel Chains.....45@60&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Copper Chain, 60&5%; Steel Chain, 60%
Pullman:
Bronze Chain, 60%; Steel Chain, 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set.8¢

Chalk—(From Jobbers.)

Carpenters' Blue....gro., 40@—¢
Carpenters' Red....gro., 35@—¢
Carpenters' White...gro., 30@—¢
See also Crayons.

Checks, Door—

Bardsley's.....45%
Pullman, per gro.....$54.00
Russwin.....40%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters,' etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—

Socket Framing and Firmer

Standard List...75&10@75&10&5%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Swan's.....75%
L. & I. J. White.....30@30&5%
L. & I. J. White, Tanged.....25&5%

Tanged—

Tanged Firmers....33 1-3@40%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Nos. 191, 181..25%

Cold— lb.

Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary... 9@10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck....35%
Beach Pat., each $8.00.....35&5%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks....40&10%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model, 25%; Standard, 40&10%; Skinner Pat., 25%; Positive Drive.....33⅓%
Planer Chucks.....30%
Face Plate Jaws.....40&10%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and 84.....30%
Geared Scroll, Nos. 33, 34 and 35..35%
Independent Iron, Nos. 18 and 318.40%
Independent Steel, No. 64.....30%
Union Czar Drill, Nos. 000, 101, 103.....35%
Universal 11, 13, 16, 17, 13, 14, 15..40%
Universal, No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....40%
Steel Face Plate Jaws, Nos. 70 and 72.....35%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co.....40&10@50%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel..₱ doz. $4.05 net
Star Shank, All Steel..₱ doz. $3.24 net
W. & C. Shank, All Steel, ₱ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
'98 Chicago Horse, each....$8.75
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each.....$6.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75

Clips, Axle—

Regular Styles, list July 1, '05.80%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c.....70%
Compression Bibbs.....65&10%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Compasses, Dividers, &c.

Ordinary Goods.....75&5@75&10%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double, 65%; Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%
Wm. Schollhorn Co.:
Excelsior Dividers.....60%
Lodi Dividers.....15&2

Conductor Pipe,—

L. C. L. to Dealers:

Territory:	*Galvanized Galv. Steel.*	*Charcoal Iron.*	*Copper. 14, 16&20 oz.*
Eastern:			
	60&30%	60&2½%	40&10%
Central:			
	70%	55&7½%	40&7½%
Western and Southern:			
	65&10%	55&2½%	40&5%
So. Western			
	62½&7½%	50&5%	40&2½%

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3	4	5	6	8
Iceland, ea.	$1.80	$2.10	$2.40	$3.00	
Gal.	2	3	4	5	6
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90

Galvanized, Lined, side handles,

Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled, 25%; Agate Lined.25%

Coopers' Tools—
See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 23@24½¢; lighter than 3 lbs. to pair.....25@26¢

Cord— Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 24¢; No. 7, 24½¢; No. 6, 25½¢.
Cable Laid Italian.....lb., *A, 18¢; B, 16¢*
Common India.....lb. 10@10½¢
Cotton Sash Cord, Tw'ted.17@19¢
Patent Russia.....lb...@14¢
Cable Laid Russia....lb...@15¢
India Hemp, Braided..lb...@18¢
India Hemp, Twisted..lb. 12@13¢
Patent India, Twisted.lb. 12@13¢
Anniston Cordage Co.: ₱ lb. solid Braided, Nos. 8 to 12, $0.24; No. 7, $0.24½; No. 6, $0.25½; ₱ doz., 50 ft. Oriole, $2.00; 50 ft., Columbia, $0.85; 50 ft., Victors, $1.00; 50 ft., 6-Thread, $1.10; 60 ft., 3-Thread, $0.95; 50 ft., Manila, $1.40; 60 ft., Jute, $0.75.
Pearl Braided, cotton, No. 6, ₱ lb, 25½¢; No. 7, 25¢; Nos. 8 to 12, 24½¢
Eddystone Braided, Nos. 8, 9 and 10, 25¢; 7, 25½¢; 6, 26¼¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....₱ lb 23 ¢
Pullman:
Wire Sash Cord.....18%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, per lb., Drab Cotton, 40¢; Italian Hemp, 40¢; Linen, 55¢; White Cotton or Spot....35 ¢
Massachusetts, White.....₱ lb 30 ¢
Massachusetts, Drab.....₱ lb 35 ¢
Phoenix, White, Nos. 8 to 12, 27¢; No. 7, 27½¢; No. 6, 28½¢.
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906...85&10&10@—
Hendryx Standard Wire Picture Cord, old list, 85&10%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber:
White and Purple, Indelible, ₱ gro. $7.50
Red, Blue, Green, Yellow and Terra Cotta.....₱ gro. $6.50
Black.....₱ gro. $4.00
See also Chalk.

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, $7.00; Light.....$6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'n Knives, 1847, ₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....₱ doz. $3.00
Wm. Rogers & Son.....₱ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise:

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

25@25&7½%
No. 202, $1.50.....40&7½%
Dixon's.....₱ doz. 40@50%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal.....40&10@50%
Little Giant.....₱ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....25%
New Triumph No. 605, ₱ doz. $24.00.. 40@50%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....₱ doz. 40@50%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters, Corn Graters, &c.....35%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₱ doz. $3.00
Combined Slaw Cutter and Corn Grater.....₱ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..₱ gr. $18@$20
Slaw Cutters, 2 Knife..₱ gr. $22@$30

Tobacco—

All Iron, Cheap..*doz. $4.25@$4.50*
Enterprise.....25@30%
National, ₱ doz., No. 1, $21; No. 2, $18.....40%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger..per doz., $9.00
Disston's:
Rapid, ₱ doz., $24.00.....25%
Samson, ₱ doz., $34.00.....25%
Iwan's Imp'ved Post Hole Auger.40&5%
Vaughan Pattern Post Hole Augers, ₱ doz., $6.25
Perfection Post Hole Diggers, ₱ doz.....$8.25
Split Handle Post Hole Diggers, ₱ doz. $7.25
Kohler's, ₱ doz., Universal, $14.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.00; Pioneer.....$7.00
Never-Break Post Hole Diggers, ₱ doz., $24.00.....60%

Dividers—See *Compasses.*

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ₱ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—
See *Knives, Drawing.*

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

Drills and Drill Stocks—

Common Blacksmiths' Drill, each.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....40%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's, 40%; Weston's..40%
Ratchet, Weston's, Style H Improved.....40%
Ratchet, No. 012.....40%
Ratchet, Whitney's, P., S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10&10@70%
Taper and Straight Shank....60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ₱ doz., 2½-in., $6; 4-in., $7.50; 6-in., ₱.....50%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Disston's.....70%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto..60&10&10@50&10&10&5%
Hurwood.....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21...25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
New England Specialty Co.....50&10%
Smith & Hemenway Co.....40&5%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles, 65%; No. 66, 75%; Victor, 55%; Defiance..70%
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L. Galvanized Galv. Steel.*	*Charcoal Iron.*	*Copper. 14, 16&20 oz.*
Eastern:			
	80%	70&5%	40&10%
Central:			
	75&10&7½%	70%	40&7½%
Western and Southern:			
	70&20&7½%	60&15&2½%	40&5%
So. Western:			
	70&20%	65&2½%	40&2½%

Terms.—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. I. Standard Gauge.....60&10%
No. 26.....50%
No. 24.....35%
No. 22.....10%
Copper.....50%

Elbows, Stove Pipe—

Dover, one piece (R. M. Co.)....40&10%
Perfect Elbows.....40%

Emery, Turkish—

	4 to 4/6:	*5 to 220: Flour.*
Kegs.....lb.	5 ¢	5½¢ 5½¢
½ Kegs.....lb.	5½¢	5¾¢ 5¾¢
¼ Kegs.....lb.	5½¢	6 ¢ 6 ¢
10-lb. cans, 10 in case....6¾¢	7 ¢	6 ¢
10-lb. cans, less than 10.....10 ¢	10 ¢	8 ¢
Less quantity..10 ¢	10 ¢	8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice

—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's ..... 50&10%
Watling's ..... 40&10%

Cord and Weight—

Ives 40%

Faucets—

Cork Lined ..... 50@50&10%
Metallic Key, Leather Lined .. 60&10@70%
Red Cedar ..... 40&10@50%
Petroleum ..... 70&10@75%
B. & L. B. Co.:
Metal Key ..... 60&10%
Star 60%
West Lock ..... 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Mtl. Key ..... 50&10%
John Sommer's Duplex Metal Key 60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined 50%
John Sommer's Reliable Cork Lined ..... 50&10%
John Sommer's Chicago Cork Lined 60%
John Sommer's O. K. Cork Lined 50%
John Sommer's No Brand, Cedar 50%
John Sommer's Perfection, Cedar 40%
McKenna, Brass:
Burglar Proof, N. P. 25%
Improved, ¾ and ⅞ inch 25%
Self Measuring:
Enterprise, ℔ doz. $36.00 ..... 40&10%
Lane's, ℔ doz. $36.00 ..... 40&10%
National Measuring, ℔ doz. $36. 40&10%

Felloe Plates—

See *Plates, Felloe.*

Files— Domestic—

List revised Nov. 1, 1899.
Best Brands ..... 70&10@75&10%
Standard Brands ..... 75&10@75&10&10%
Lower Grade ..... 75&10&10@80&10%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 ..... 33 1-3@40%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 ..... $3.75
Fusible Links, No. 96 ..... 50%
Expansion Bolts, No. 107 ..... 60&10%

Grindstone—

Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz	*$3.25*	*3.75*	*4.25*	*4.75*

P., S. & W. Co. ..... 30&10@40%
Reading Hardware Co. 60%
Stowell's Giant Grindstone Hanger .. ℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy, 50&10&10%; Light ..... 60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ezy Potato ..... 60&10%
Victor, Hay ..... 60&15&2½%
Victor, Manure 60%
Victor, Header 65%
Champion, Hay 60%
Champion, Header 65%
Champion, Manure ..... 60&15&2½%
Columbia, Hay ..... 60&20%
Columbia, Manure 70%
Columbia, Spading ..... 70&12½%
Hawkeye Wood Barley 40%
W. & C. Potato Digger ..... 60&10%
Acme Hay ..... 60&20%
Acme Manure, 4 tine ..... 60&10&5%
Dakota Header ..... 60&20%
Jackson Steel Barley ..... 60&20%
Kansas Header 65%
W. & C. Favorite Wood Barley 40%
Plated.—See Spoons.

Frames— Saw—

White, S'g't Bar, per doz. 75@80¢
Red, S'g't Bar, per doz. $1.00@1.25
Red, Dbl. Brace, per doz. $1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.30*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse—

Per 1000 Feet.

Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped .. 3.65
Waterproof Dbl. Taped .. 4.40
Waterproof Tpl. Taped .. 5.15

10&2½%

Gates, Molasses and Oil—

Stebbins' Pattern ..... 80&10%

Gauges—

Marking, Mortise, &c. ..... 50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c. ..... 50&50&10%
Scholl's Patent ..... 50&10@50&10&10%
Door Hangers ..... 50@50&10%
Disston's Marking, Mortise, &c. 67½%
Stanley R. & L. Co.'s Butt and Rabbet Gauge 35%
Marking and Mortise 60%
Wire, Brown & Sharpe's 25%
Wire, Morse's 25%
Wire, P., S. & W. Co. 33⅓%

Gimlets— Single Cut—

Numbered assortments, per gro.

Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co. ..... 60@60&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush .. 25&10@50%
International Glue Co. (Martin's) .. 40%

Grease, Axle—

Common Grade .... *gro. $4.50@6.00*
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ℔ doz., 1 lb, $1.20; 2 lb $2.00
Helmet Hard Oil 25%

Griddles, Soapstone—

Pike Mfg. Co. ..... 33⅓@33⅓&10%

Grindstones—

Bicycle Emery Grinder $6.50
Bicycle Grindstones, each ..... $2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, per inch, ℔ doz. ..... $2.00 } 33⅓%
Pike Mower and Tool Grinder, each ..... $6.00 } 33⅓%

Grips, Nipple—

Perfect Nipple Grips ..... 40&10&2%

Halters and Ties—

Cow Ties ..... 60&10@60&10&5%
Covert Mfg. Co.:
Web 45%
Jute Rope 45%
Sisal Rope 33⅓%
Cotton Rope 45%
Hemp Rope 45%
Oneida Community:
Am. Coil and Halters ..... 40@40&5%
Am. Cow Ties ..... 45@50%
Niagara Coil and Halters .. 45@50&5%
Niagara Cow Ties .... 45&5@50&10&5%

Hammers—

Handled Hammers—

Heller's Machinists' ... 40&10@40&10&10%
Heller's Farriers ..... 40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75 ..... 50%
Peck, Stow & Wilcox, Steel 50%
Fayette R. Plumb:
Plumb, A. E. Nail ..... 33⅓&7½@33⅓&10&7½%
Engineers' and B. S. Hand ..... 50&7½&5@50&10&7½&5%
Machinists' Hammers .. 50&5@50&10&5%
Riveting and Tinners' ..... 40&2½@40&10&2½%

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢ .. 80&10%
3 to 5 lb., per lb., 40¢ ..... 80&10%
Over 5 lb., per lb., 30¢ .. 80&10&10%
Wilkinson's Smiths' ... lb. 9½@10¢

Handles—

Agricultural Tool Handles

Axe, Pick, &c. .... 60&10@60&10&5%
Hoe, Rake, &c. ..... $5@50%
Fork, Shovel, Spade, &c.:
Long Handles ..... $5@50%
D Handles ..... 50@50&5%

Cross-Cut Saw Handles—

Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—

Auger, assorted ... *gro. $2.50@3.00*
Brad Awl ..... *gro. $1.65@1.75*
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@ $2.65; Hickory ..... *$2.15@2.40*
Socket Firming, Apple, $1.75@ $1.95; Hickory ..... *$1.45@1.60*
Socket Framing, Hickory, $1.60@1.75
File, assorted ..... *gro. $1.30@1.40*
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished .. *65@75¢*
Plane Handles:
Jack, doz. 80¢; Jack, Bolted .. *75¢*
Fore, doz. 45¢; Fore, Bolted .. *90¢*
Chapin-Stephens Co.:
Carving Tool ..... 40@40&10%
Chisel ..... 65@65&10%
File and Awl ..... 65@65&10%
Saw and Plane ..... 40@40&10%
Screw Driver ..... 40@40&10%
Millers Falls Adj. and Ratchet Auger Handles ..... 15&10%
Nicholson Simplicity File Handle ... ℔ gro. $0.85@$1.50

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.

Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door 50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle ..... 60&10%
Roller Bearing 70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00 ..... 70%
Roller Bearing, No. 11, $15.00 .. 70%
Roller Bearing, Ex. Hy., No. 22, $18.00 ..... 70%
Hinged Hangers, $16.00 .... 60&10%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard ..... 60&5%
Hinged ..... net $6.40
Covered ..... 60&2%
Special ..... 70&5%
Lawrence Bros.:
Advance and Sterling ..... 60&10%
Cleveland and Peerless 75%
Clipper, No. 75 ..... 60%
Crown ..... 60&10%
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25. Giant ..... 60&5%
Hummer ..... 70&5%
New York ..... 60&10%
McKinney Mfg. Co.:
No. 1, Special, $15 ..... 60&10%
No. 2, Standard, $18 ..... 60&10%
Hinged Hangers, $16 ..... 50%
Meyers' Stayon Hangers ..... 60&5%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track No. 3 .. $2.00
Ball B'r'g St'l Track No. 10. 50&10%
Roller B'r'g St'l Track No. 12. $2.15
Roller B'r'g St'l Track No. 13. $2.30
Roller B'r'g, Nos. 39, 41, 43, 70&10%
Hero, Adj. Track No. 19 .. 50&10%
Adjustable Track Tandem Trolley Track No. 16 ..... 50&10%
Seal, Steel Track No. 8 ..... $2.25
Auto Adj. Track No. 22 .. 50&10%
Trolley B, D. No. 17, $1.25; F, D. No. 120, $2.10; No. 121, $2.25; No. 150 ..... $2.35
Safety Underwriters F. D. No. 101 ..... 60%
Tandem No. 44 .. 2½ and 3 60&10%
Palace, Adjustable Track No. 132 ..... 50&10%
Royal, Adjustable Track No. 122 ..... 50&10%
Ives' Wood Track No. 1 ..... $2.00
Trolley B, D, No. 20 .. 50&10%
Trolley B, D, No. 24, $1.30; No. 27, $1.40; No. 28 ..... $1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43; 44, Sizes 1 and 2 .. 70&10%
Anti-friction, No. 42; No. 44, sizes 2½ and 3 ..... 60&10%
Hinged Tandem No. 48 .... 60&5%
Folding Door B. B. Swivel No. 135 ..... 40%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing 40%
Ajax Hinge Door 60%
Apex Parlor Door ..... 50&10&5%
Atlas, 60%; Freight Car Door, 60%; Baggage Car Door 50%
Climax Anti-Friction ..... 50&10%
Elevator 40%
Express 50%
Interstate ..... 60&10%
Lundy Parlor Door ..... 50&10%
Magic, 60%; Rex Hinge Door, 60%; Matchless ..... 60&10%
Nansen ..... 70&5%
Parlor Door, 50&10%; Railroad, 50&10%
Street Car Door 50%
Steel, Nos. 300, 401, 500 .... 50&10%
Underwriters' Fire Door 40%
Wild West Warehouse Door .. 50%
Zenith for Wood Track .... 50&10%
A. L. Sweet Iron Works:
Check Back, 70%; Eagle 70%
Climax Anti-Friction ..... 50&10%
Hylo Hinge, New Perfection, Pilot, Pilot Hinge 60%
Rider Wooster 65%
Western Pattern 70%
Taylor & Boggis Fty Co.'s Kidder's Roller Bearing. 50&15&10&5%

Extra 5&10% often given.

Hangers— Garment—

Pullman Trouser, ℔ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.00; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $15.00; Garment Hanger Loops, Round Nickeled, per gro. $15.00
Victor Folding ..... ℔ gro. $9.60
Western, W. G. Co. ..... 70&10%

Gate—

Myers' Patent Gate Hangers, ℔ doz. net $4.50

Joist and Timber—

Lane Bros. Co. 30%

Hasps—

Griffin's Security Hasp 50%
McKinney's Perfect Hasp, ℔ doz. .. 50%

Hatchets—

Regular list, first quality 50%
Second quality $1.00 per doz. less than first quality.

Heaters, Carriage—

Clark, No. 5 $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50 ..... 15%
Clark Coal, ℔ doz. $0.75 ..... 10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Charles Parker Co. ..... 70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00 ..... 20%
Reading's Gravity 60%
Stanley's Steel Gravity Blind Hinges, ℔ doz. sets, without screws, $0.90; with screws, $1.20.
Wrightsville Hardware Co.:
O. S., Lull & Porter ..... 75&10&5%
Acme, Lull & Porter ..... 75&10%
Queen City Reversible ..... 75&10%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 75&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 75&10&5%
1868, Old Pat'n, Nos. 1, 3 & 5 .... 75&10&5%
Tip Pat'n, Nos. 1, 3 & 5 .... 75&10&5%
Buffalo Gravity Lockin', Nos. 1, 3 & 5 ..... 75&10&5%
Shepard's Double Locking, Nos. 20 & 25 ..... 70%
Champion Gravity Locking, No. 75. 75%
Steamboat Gravity Locking, No. 10. 75%
Pioneer, Nos. 060, 45 & 5½ 75%
Empire, Nos. 101 & 103 ..... 70%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 60%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs.	*$2.00*	*2.70*	*5.00*
Hinges only	*1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.35*

New England:
With Latch ..... doz. ... @$2.00
Without Latch ... doz. ... @$1.60
Reversible Self-Closing:
With Latch ..... doz. ... @$1.75
Without Latch ... doz. ... @$1.35
Western:
With Latch ..... doz. $1.75
Without Latch ..... doz. $1.15
Wrightsville Hardware Co.:
Shepard's or Clark's, doz. sets.

Nos.	1	2	3
Hinges with Latches	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Pivot Hinges

Bommer Bros. Pivot 40%
Lawson Mfg. Co. Matchless 45%

Spring Hinges—

Holdback, Cast Iron ... *$6.50@$7.00*
Non-Holdback, Cast Iron *$6.25@$6.75*
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges 45%
Bardsley's Patent Checking .. 15%
Bommer Bros.:
Bommer Ball Bearing Floor, 40%
Bommer Spring Hinges 40%
No. 999 Wrot, Steel Hold Back, ℔ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges 25%
Triple End Spring Hinges 50%
Chicago (Ball Bearing) Floor .. 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Columbian Hardware Co.:
Acme, Wrought Steel 30%
Acme, Brass 25%
American 30%
Columbia, ℔ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ℔ gr. $12.00
Gem, new list 30%
Clover Leaf ..... ℔ gr. $12.00
Oxford, new list 30%
Floor Spring Hinges ..... 65&10%
Lawson Mfg. Co., Matchless 30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door ..... ℔ gr. $9.00
Ball Bearing Floor Hinge 50%
Ohio Detachable Screen Door Hinge ..... ℔ gr. $12.00
Superior Spring Hinge Co.:
Superior Floor Hinges 33⅓%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ℔ gr. $12.50
Ideal, No. 4 ..... ℔ gr. $9.00
New Idea No. 1 ..... ℔ gr. $9.00
New Idea, Double Acting 45%
New Idea Floor 45%
Van Wagoner:
Ball Bearing 25%
No. 777 Sh't Steel Holdb'k, ℔ gro. pr. $9

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list December 26, 1904:

Light Strap Hinges .. 65%
Heavy Strap Hinges .. 75%
Light T Hinges 60%
Heavy T Hinges 55%
Extra H'y T Hinges .. 70%
Hinge Hasps 45%
Cor. Heavy Strap 75%
Cor. Ex. Heavy T .. 70&10%

Extra, 10&5@ 10&10%

Screw Hook and Strap. { *6 to 12 in.* .lb. 3¾¢ ; *1¼ to 20 in.* .lb. 3½¢ ; *22 to 36 in.* .lb. 3¾¢

Screw Hook and Eye:
¾ to 1 inch.....lb. 6½¢
⅝-inch.....lb. 7½¢
½-inch.....lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—
	Per doz.			
Inch	15	16	17	18
Galv. Open	$2.50	2.75	3.00	3.25
Jap. Open	$1.90	2.10	2.25	2.55
Galv. Funnel	$3.00	3.30	3.60	3.90
Jap. Funnel	$2.45	2.65	2.85	3.30

Masons' Etc.—
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $0.95
Steel Mortar, No. 158.....each $1.25

Hoes— Eye—
Scovil and Oval Pattern.....
60&10@60&10&10%
Grub, list Feb. 23, 1899.....
70&10@75&10%
D. & H. Scovil.....30%

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Cronk's Weeding No. 1, $2.00; No. 2, $2.38
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ₩ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₩ doz. 66⅔%
Junior Size.....₩ doz. $4.00
Ft. Madison Sprouting Hoe..₩ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....
75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....₩ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ₩doz.$4.85

Hoisting Apparatus—
See *Machines, Hoisting.*

Holders— Bit—
Angular, ₩ doz. $24.00.....45&10%

Door—
Bardsley's.....45%
Empire.....50%
Pullman.....50%
Superior.....33⅓%

File and Tool—
Nicholson File Holders and File Handles.....33⅓&40%

Fruit Jar—
Triumph Fruit Jar Holder, ₩ gross, $10.80; ₩ doz.....$1.25

Hones—Razor—
Pike Mfg. Co., Belgian, German and Swaty.....50%

Hooks—Cast Iron—
Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—
Belt.....80&10@..%
Wire C. & H. Hooks:.....
75&10@75&10&10%
Columbian Hdw Co., Gem.....70&10%
Parker Wire Goods Co., King..70&10%
Van Wagoner, Coat and Hat.....70%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—
Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $3.50.
Cotton.....*doz. $1.05@$1.25*
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—
Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25
Grass, best, all sizes, per doz.$1.60
Grass, common grades, all sizes, per doz.....*$1.30*
Whiffletree.....*lb. 5¾@6¢*
Hooks and Eyes:
Brass.....60&5@60&10&5%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ₩ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See *Nails, Horse.*

Horseshoes—
See *Shoes, Horses.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition.....*ft. 5 @ 6 ¢*
3-ply Guaranteed..*ft. 8 @ 9 ¢*
4-ply Guaranteed..*ft. 10 @11 ¢*
Cotton Garden, ¾-in., coupled:
Low Grade.....*ft. 8 @ 9 ¢*
Fair Quality.....*ft. 10 @11 ¢*

Irons— Sad—
From 4 to 10.....*lb. 4 @3½¢*
B. B. Sad Irons.....*lb. 3¼@3½¢*
Mrs. Potts', cents per set:
	Nos. 50	55	60	65
Jap'd Tops	65	62	75	72
Tin'd Tops	70	67	80	77

New England Pressing.*lb. 3¾@4¢*

Pinking—
Pinking Irons.....*doz. 60¢*

Irons, Soldering
See *Coppers.*

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&10&2%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Kettles—
Brass, Spun, Plain.....*20@25%*
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....40%

Corn—
Wilkinson Wilcut Brand Knives and Hooks.....60%
Withington Acme, ₩ doz. $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List.....*75&5@75&10%*
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....60%
Swan's.....75%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—
Serrated Edge, per doz. $5.75@6.00
Iwan's Sickle Edge.....₩ doz. $9.50
Iwan's Serrated.....₩ doz. $10.00

Mincing—
Buffalo.....₩ gro. $13.00

Miscellaneous—
Farriers'.....*doz. $3.00@3.25*
Wostenholm's.....₩ doz. $3.00@3.25

Knobs—
Base, 2½-inch, Birch, or Maple, Rubber Tip.....*gro. $1.25@$1.50*
Carriage, Jap., all sizes.....
gro. 40@45¢
Door, Mineral.....*doz. 65@70¢*
Door, Por. Jap'd.....*doz. 70@75¢*
Door, Por. Nickel..*doz. $2.05@2.15*
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—
See *Belting, Leather.*

Ladders, Store, &c.—
Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—
L. & G. Mfg. Co. (low list).....25%
P. S. & W.....50%
Reading.....50%

Lanterns—Tubular—
Regular Tubular, No. 0.....
doz. $4.25@4.50
Lift Tubular, No. 0.....
doz. $4.75@5.00
Hinge Tubular, No. 0.....
doz. $4.75@5.00
Other Styles.....*40@40&5%*

Bull's Eye Police—
No. 1, 2¾-inch.....*$2.75@3.00*
No. 2, 3-inch.....*$3.00@3.25*

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—
Roggin's Latches, with screw..
doz. 55@40¢

Door—
Allith Mfg. Co., Automatic, No. 400, ₩ doz.....$4.00
Cronk & Carrier Mfg. Co., No. 101, ₩ doz. $2.00
Cronk & Carrier Mfg. Co., Latch, Hasp and Staples.....50%
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50
Stowell's Steel.....50%

Leaders, Cattle—
Small.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.:
Cotton, Hemp and Jute, 45%; Sisal, 33⅓%.

Lifters, Transom—
R. & E.....33⅓%

Lines—
Wire Clothes, Nos. 18 19 20
100 feet.....*$2.25 2.00 1.75*
75 feet.....*$1.75 1.55 1.10*
Anniston Waterproof Clothes, 50 ft. ₩ gro., $25.00; Gilt Edge $23.00; Air Line, $23.00; Acme, $18.00; Alabama, $17.00; Empire, $16.00; Advance, $14.00; Eclipse, $13.50; Chicago, $11.50; Standard, $10.50; Columbia, $9.50; Allston, $13.50; Calhoun, $12.00.
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₩ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%

Locks— Cabinet—
Cabinet Locks...*33⅓@33⅓&7½%*

Door Locks, Latches, &c.—
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....40%

Elevator—
Stowell's.....50%

Padlocks—
Wrought Iron....*75&10&5@80&5%*
Net prices are general.
R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—
Ives' Patent:
Bronze and Brass, 62½%; Crescent, 50&10%; Iron, 62½%; Window Ventilating, 60%; Robinson Pat. Ventilating Sash Lock, 40%; Wrought Bronze and Brass, 55%; Wrought Steel, 55%.
Pullman Patent Ventilating Lock..25%
Reading.....40%

Machines—Boring—
Com. Upr't, without Augers,
$2.00@2.25
Com. Angl'r, without Augers,
$2.25@2.50
Swan's Improved.....40&10%
Angular.
Jennings', Nos. 1 and 4.....35&5%
Millers' Falls.....5.75
Snell's, Rice's Pat. 2.50 2.75

Corking—
Reisinger Invincible Hand Power.... ₩ doz. $48.00

Fence—
Williams' Fence Machines....each, $5.50

Hoisting—
Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....20%

Ice Cutting—
Chandler's.....12½%

Washing—
Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$54.00
Champion Rotary Banner No. 1	$54.00
Standard Champion No. 1	$48.00
Standard Perfection	$36.00
Cinti Square Western	$30.00
Uneeda American, Round	$30.00

Mallets—
Hickory.....*45&5@50%*
Lignumvitæ.....*45&5@50%*
Tinners' Hickory and Apple-wood.....*doz. 45&5@50%*

Mangers, Stable—
Swett Iron Works.....50%

Mashers, Vegetable—
Western W. G. Co., Potato....60&10%

Mats, Door—
Elastic Steel (W. G. Co.), new list.. 50&10%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—
Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Mowers, Lawn—
NOTE.—Net prices are generally quoted
Cheapest.....*all sizes, $1.85@2.00*
Cheap.....*all sizes, $2.00@2.50*
Better Grade..*all sizes, $2.50@4.50*
	12	14	16	18-in.
High Grade	$4.50	4.75	5.00	5.25

Continental.....60&5%
Great American.....70%
Great American Ball Bearing, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr. Ball Bearing....60%
Pennsylvania, Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel....70&10&10&5%
Style B, Low Wheel.....70&10&5%
Style C, High Wheel.....70&10%
Style D, High Wheel.....70%
Philadelphia:
Styles M., S., C., K., T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.50%

Nails—
Wire Nails and Brads, Miscellaneous.....*85&10@85&10&5%*
Cut and Wire, See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—
Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Champlain	28	26	25	24	23	.....50%
Coleman	13	12	12	11	11	.....net
New Haven	23	21	20	19	18	...40&5%

Western.....₩ lb 8½¢
Jobbers' Special Brands.....
per lb. 9@10¢

Picture—
	1½	2	2½	3	in.
Brass H'd.	.45	.55	.60	.70	.. gro
Por. Head	1.10	1.10	1.10	..	gro

Nippers—
See *Pliers and Nippers.*

Nuts—
Cold Punched: Off list.
Square, Blank or Tapped..
$4.90@5.00¢
Hexagon, Blank or Tapped..
5.80@5.40¢
Square, Blank, C. & T.5.20@5.30¢
Hexagon, Blank, C. & T..
5.90@6.00¢
Hot Pressed:
Square, Blank.....*5.10@5.20¢*
Hexagon, Blank.....*5.50@5.60¢*
Square, Tapped.....*5.00@5.10¢*
Hexagon, Tapped.....*5.40@5.50¢*

Oakum—
Best.....*lb., 6½¢*
U. S. Navy.....*lb., 6¢*
Navy.....*lb., 5¢*
Plumbers' Spun Oakum.....*3¾¢*
In carload lots ½¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....*50&10%*
Tin or Steel.....*65&10&5@70%*
Zinc.....*65&10&5@70%*
Chase or Paragon:
Brass and Copper.....*50&10%*
Tin or Steel.....*65&10%*
Zinc.....*65&10%*
Malleable, Hammers' Imp'ed. Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*
Sprague, Iron Handle....*30@35¢*
Sprague, Wood Handle...*35@40¢*
Sardine Scissors.....*$1.75@$3.00*
National.....50&10%
Stowell's Sprague.....₩ doz. 35@45¢
Vim Tin Shear and Can Opener, ₩ doz., 75c.; per gro., $7.50

Egg—
Nickel Plate, ₩ doz., $2.00; Silver Plate, $4.00.

Packing—
Asbestos Packing, Wick and Rope.....*17@22¢*

Rubber—
(Fair quality goods.)
Sheet, C. I.....*11@12¢*
Sheet, C. O. S.....*11@12¢*
Sheet, C. B. S.....*12@13¢*
Sheet, Pure Gum.....*40@45¢*
Sheet, Red.....*40@50¢*
Jenkins' '96, ₩ lb 80¢.....23@25&5%

Miscellaneous—
American Packing...*lb. 7@10 ¢*
Cotton Packing.....*lb. 16@25 ¢*
Italian Packing.....*lb. 9@12½¢*
Jute.....*lb. 4@ 4½¢*
Russia Packing.....*lb. 8@11 ¢*

Pails, Creamery—
R. M. Co., with gauges—No. 1, $6.25; No. 2, $6.50 ₩ doz.

Pails, Water, Well, &c.—
See *Buckets.*

Pans— Dripping—
Standard List.....*65&10%*

Fry—
Common Lipped:
Nos.	1	2	3	4	5
Per doz	$0.75	0.80	0.90	1.10	1.30

Refrigerator, Galva.—
Inch	12	14	16	18
Per doz	$1.75	2.25	2.80	3.15

Roasting and Baking—
Regal, R, M, Co., ₩ doz., Nos. 5, $4.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory ₩ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ₩ gro.:
No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper
Asbestos:	*lb.*	
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.	*6¢*	Per roll
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lbs., per 100 sq. ft.....	*8¢*	
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.....	*7¢*	

Rosin Sized Sheathing: 500 sq. ft.
Light weight, 25 lbs. to roll.....
35@40¢
Medium weight, 30 lbs. to roll.....
40@45¢
Heavy weight, 40 lbs. to roll..
56@60¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....*$18.00*
Red Rope Roofing, 250 sq. ft. per roll.....*$1.75*

Tarred Paper—
1 ply (roll 300 sq. ft.), ton.....
$32.50@35.50
2 ply, roll 108 sq. ft.....*55¢*
3 ply, roll 108 sq. ft.....*75¢*
Slater's Felt (roll 500 sq. ft.).*70¢*

Sand and Emery—
Flint Paper and Cloth..*50&10@60%*
Garnet Paper and Cloth.....*25%*
Emery Paper and Cl'h..*50&10@60%*

Parers— Apple—
Advance.....₩ doz. $4.00
Baldwin.....₩ doz. $4.00
Bonanza Improved.....each $6.50
Daisy.....₩ doz. $4.00
Dandy.....each $7.50
Eureka Improved.....each $20.00
Family Bay State.....₩ doz. $15.00
Improved Bay State.....₩ doz. $36.00
Little Star.....₩ doz. $5.00
New Lightning.....₩ doz. $7.00
Reading 72.....₩ doz. $3.25

Reading 78.....℔ doz. $6.25
Rocking Table.....℔ doz. $6.20
Turn Table '98.....℔ doz. $6.00
White Mountain.....℔ doz. $5.00

Potato—

Saratoga.....℔ doz. $7.00
White Mountain.....℔ doz. $6.00

Picks and Mattocks—

List, Feb. 23, 1899.....75@75&5%
Cronk's Handled Garden Mattock, ℔ doz., $6.40.....33⅓%

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass.....50&10@60%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—

Carload lots.
Standard, 2-6 in..50&10@50&10&5%
Extra Heavy, 2-6 in.....65&10%
Fittings.....70&10@70&10&5%

Pipe, Merchant—

Consumers, Carloads.

	Steel. Blk.	Galv.	Iron. Blk.	Galv.
⅛ & ¼ *in.*	71%	55%	68%	52 %
⅜ *in.*	73%	59%	70%	56 %
½ *in.*	75%	63%	72%	60 %
¾ *to 6 in.*	79%	69%	76½%	66⅔%
7 to 12 in.	74%	59%	71½%	56 %

Pipe, Vitrified Sewer—

Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class.....85@86%
Second-class.....90%
NOTE.—Market irregular.

Pipe, Stove—

	C. L.	L. C. L.
Edwards' Nested:		
5 in., per 100 joints	$7.00	$8.00
6 in., per 100 joints	7.50	8.50
7 in., per 100 joints	8.50	9.50

Planes and Plane Irons—

Wood Planes—

Bench, first qual.....35@35&10%
Bench, second qual...45@45&10%
Molding.....30@30&10%
Bailey's (Stanley R. & L. Co.).....40%
Chapin-Stephens Co.:
Bench, First Quality.....35%
Bench, Second Quality.....45%
Molding and Miscellaneous.....30%
Toy and German.....35%
Chaplin's.....60%
Union.....60%

Iron Planes—

Bailey's (Stanley R. & L. Co.).....40%
Chaplin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....35%
Union.....60%

Plane Irons—

Wood Bench Plane Irons.....25@25&10%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Stanley R. & L. Co.....35%
Union.....50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse.....℔ doz. $8.50

Plates—

Felloe.....lb.4@4¼¢
Self-Sealing Pie Plates (R. M. Co.), ℔ doz. $2.00.....50%

Pliers and Nippers -

Button Pliers....75&10@75, 10, 5%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe.. 7 8 10 12-in.
$2.00 $2.25 $2.75 $3.50
Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's.....60%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&10@40&10&10%
The Nettleton Mfg. Co. Reversible Cutting Nippers.....40%
P., S. & W. Tinners' Cutting Nippers.....40%
Wm. Schollhorn Co.:
Bernard, 33⅓%; Elm City, 33⅓%; Lodi, 50%; Paragon, 50%.
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10&5%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10&5%
Extension Sights.....30@30&10&5%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels.....67½%
Disston's Pocket Levels.....67½%
C. E. Jennings & Co.'s Iron.....33⅓%
C. E. Jennings & Co.'s Iron, Adjustable.....40&7½%
Stanley R. & L. Co.....40%
Stanley's Duplex.....33⅓%
Woods' Extension.....33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00.....50%

Points, Glaziers'—

Bulk and 1-lb. papers.....lb..10¢
½-lb. papers.....lb..9@10½¢
¼-lb. papers.....lb..9¾@11¢

Pokes, Animal—

Ft. Madison Hawkeye.....℔ doz. $3.25
Ft. Madison Western.....℔ doz. $4.00

Police Goods—

Manufacturers' Lists...25@25&5%
Tower's.....25%

Polish—Metal, Etc—

Glasbrite, No. 2, 5 lb can (powder), each, $1.25; ℔ doz., $12.00; No. 2, 10 lb can (cake), each, $2.50; ℔ doz., $24.00.
Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $3.72....40%
Prestoline Paste.....40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25; ℔ gro., $12.00.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75; ℔ gro., $18.00.
Wynn's White Silk, ½ pt. cans, ℔ doz.....$2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans, ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon's, ℔ gr. $5.75.....10%
Dixon's Plumbago.....℔ lb 8¢
Fireside.....℔ gr. $2.50
Gem, ℔ gr. $1.50.....10%
Japanese.....℔ gr. $3.50
Jet Black.....℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....℔ doz. $1.00
Black Silk, 5 oz. box.....℔ doz. $0.75
Black Silk, ½ pt. liq.....℔ doz. $1.00

Poppers, Corn—

1 qt., Square.....gro. $8.00
1 qt., Round.....gro. $9.00
1½ qt., Square.....gro.$10.00
2 qt., Square.....gro.$12.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Post, each, 5 ft., 42¢; 6 ft., 46¢; 6½ t., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled.....40%
Tinned.....35%

Powder—

In Canisters:
Duck, 1 lb.....each 45¢
Fine Sporting, 1 lb....each 75¢
Rifle, ½-lb.....each 15¢
Rifle, 1-lb.....each 25¢
In Kegs:
12½-lb. kegs.....$3.50
25-lb. kegs.....$4.50
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50
King's Smokeless: Shot Gun. Rifle.
Keg (25 lb bulk).....$12.00 $15.00
Half Keg (12½ lb bulk)... 6.25 7.75
Quarter Keg (6¼ lb bulk). 3.25 4.00
Case 24 (1 lb cans bulk).. 14.00 17.00
Half case 12 (1 lb c. bk).. 7.25 8.75
Robin Hood Sm'less Shot Gun..50&20%

Presses—

Fruit and Jelly—

Enterprise Mfg. Co.....20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00.....50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Nail—

Cyclops.....50%
Miller's Falls, No. 3, ℔ doz., $12.00..
33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00.....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Scranton, Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B, case lots, ℔ doz., No. 2, $6.00; No. 3, $5.50.
Giant No. 1, ℔ doz. $18; No. 2, $16.50; No. 3, $15.....33⅓%
Staple Pullers.....60%
Parrot Tack and Stub Puller, ℔ doz., 75c.; ℔ gro., $8.00

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye, doz., 4 in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz.	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.27	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.67
Inch	1½	1¾	2	2½

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction..60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1¾ and 2 in.....16@19¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in....17@19¢
Acme.....1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless..50%
Ideal.....70&10%
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy..1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—

Cistern.....60@60&10%
Pitcher Spout.....80@80&10%
Wood Pumps, Tubing, &c..45@50%
Barnes Dbl. Acting (low list).....50%
Barnes' Pitcher Spout.....75&10&5%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....℔ doz. $6.75
Flint & Walling's, Fast Mail Hand, (low list).....55%
Flint & Walling's Fast Mail (low list).....55&5%
Flint & Walling's Tight Top Pitcher.80%
National Specialty Mfg. Co., Measuring, $6.00.....30%
Mechanical Sprayer.....$6.00
Myers' Pumps (low list).....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50&10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00
Inch...	3	3¼	3½	3¾	4
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch...	2½	3	3½	4
	$2.75	3.85	5.00	6.00

Punches—

Saddlers' or Drive, good.....doz. 50@75¢
Spring, single tube, good quality.....$1.75@2.00
Revolving (4 tubes).....doz. $3.50@3.75
Bemis & Call Co.'s Cast St'l Drive.50%
Bemis & Call Co.'s Check.....55%
Morrill's Nos. 1AA, 1A, 1B, 1C, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Wm. Schollhorn Co.:
Bernard.....33⅓%
Lodi, 50%; Paragon.....50%
Steel Screw, B. & K. Mfg. Co.....50%
Tinners' Hollow, P., S. & W. Co...40%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.41.....60%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron.... 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢.....30%
Allith Mfg. Co.: Reliable Hanger Track.....50%
Cronk's:
Double Braced Steel Rail..℔ ft. 2¾¢
O. N. T. Rail.....2½¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.60.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.40; 1¼ in., $4.10.
O. N. T., ℔ 100 ft., 1 in., $2.75; 1¼ in., $3.50; 1½ in., $4.00.
Standard, 1¼ in.....℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.00
New York, 1 x 3-16 in., ℔ 100 ft. $2.75
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢..50%
None Better.....℔ ft. 3¾¢
Standard.....℔ ft. 4 ¢
Myers' Stayon Track.....60&10%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.
Stowell's:
Cast Rail.....℔ ft. 1¾¢
Steel Rail, Plain.....25%
Wrought Bracket, 1 3-16 in....℔ ft. 3¢
Wrought Bracket, 1¼ x 5-16..℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢.....60%
P. L. B. Steel Rail.....℔ 100 ft. $3.00
No. 0, 1 x 3-16.....℔ 100 ft. $2.75

Rakes—

NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net.....$4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00..75%
Victor Garden, ℔ doz. 12 teeth, $15.00; 14, $16.50; 16, $18.00.....80%
Queen City Lawn, ℔ doz., 20 teeth, $3.45; 24, $3.60.....net.
Anticlog Lawn, ℔ doz.....$4.00
Malleable Garden.....70&10%
Kohler's:
Lawn Queen, 20-tooth.....℔ doz. $3.45
Lawn Queen, 24-tooth.....℔ doz. $3.60
Paragon, 20-tooth.....℔ doz. $2.75
Paragon, 24-tooth.....℔ doz. $3.00
Steel Garden, 14-tooth....℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—

Disston's.....75%
Heller Bros.'.....70&5@70&10&5%
McCaffrey's American St'd...60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—

Boras—I C.....60%
Fox Razors, ℔ doz., No. 42, $20.00; No. 44, $20.00; No. 82, Platina, $25.00. } Discount
Red Devil.....50%
Silberstein:
Carbo Magnetic, $18.00; Griffon, No. 65, $15.00; Griffon, No. 00, $12.00; all other Razors, 40%.

Safety Razors—

Kampfe Bros.:
Star Safety, 25%; Star Interchangeable, 25%; Star Safety Corn, 25%.
Silberstein.....40%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....25%
Aluminum, German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P., 33¼%; 2904 PN, 33¼%; 0924 N., 33⅓%; 02084 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓%.....
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PB, 202 PB.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*

Japanned, Electroplated and Bronzed.....70%
White Porcelain Enamel....60%
Solid Brass or Bronze Metal, 40&10%

Revolvers—

Single Action.....95¢@$1.00
Double Action, except 44 cal..$1.85
Double Action, 44 caliber....$2.00
Automatic.....$3.25
Hammerless.....$3.75

Riddles, Hardware Grade

16 in.....per doz.$2.50@$2.75
17 in.....per doz.$2.75@$3.00
18 in.....per doz.$3.00@$3.25

Rings and Ringers—

Bull Rings—

	2	2½	3 inch.
Steel	$0.70	0.75	0.80 doz.
Copper	$1.00	1.15	1.40 doz.

Rea's Improved Self-Piercing, Copper, 2 in., ℔ doz., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—

Hill's Rings, gro. boxes.$4.00@4.50
Hill's Ringers, Gray Iron..... doz. 50@55¢
Hill's Ringers, Malleable Iron.. doz. 70@75¢
Blair's Rings...per gro.$4.75@5.25
Blair's Ringers.per doz. $0.60@ .65
Brown's Rings..per gro.$5.00@5.50
Brown's Ringers.per doz.$0.60@ .65

Rivets and Burrs—

Copper.....45@45&5%
Iron or Steel.....75@75&5%

Bifurcated and Tubular—

Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 23@25¢; Tin boxes, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—

Acme, Stowell's Anti-Friction.....50%
Cronk's Stay No. 65, $0.90; No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56.....$0.84
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%
Stowell's Barn Door Stay..℔ doz. $1.00
Swett's Anti-Friction.....50%
Screw and Spike Stay.....℔ doz. 45¢
Hinge Adjustable Stay.....℔ doz. 90¢

Rope—

Manila, 7-16 in. diam. and larger:
Pure.....lb., 12½¢
Sisal, 7-16 in. diam. and larger:
Pure.....lb., 9¢
Sisal, 7-16 in. diam. and larger:
No. 2 quality.....lb., 7¾¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed.....lb., 7¾¢
Pure.....lb., 9¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred:
Mixed.....lb., 7¾¢
Pure.....lb., 9¢
Cotton Rope:
Best, ¼-in. and larger..16½@18¢
Medium, ¼-in. and larger, 15½@16½¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope:
Thread, No. 1, ¼-in. & up, lb.7½¢
Thread, No. 2, ¼-in. & up, lb..7¢
Old Colony Manila Transmission Rope.....℔ lb 17½¢

Wire Rope—

Galvanized.....37½&2½%
Plain.....45&2½%

Ropes, Hammock—

Covert Mfg. Co.:
Jute, 45%; Sisal.....33⅓%

Rules

Boxwood .....60@60&10%
Ivory .....35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold .....27½&10&10%
Ivory .....35@35&10&10%
Miscellaneous .....50@50&10&10%
Stephens' Combination.....55@55&10%
Stationers' .....10@10&10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....60%
Stanley R. & L. Co.:
Boxwood 62½%
Ivory 45%
Miscellaneous 60%
Zig Zag.....40%
Zig Zag, Pin Joint.....42½%
Upson Nut Co.:
Boxwood .....60@60&10%
Ivory .....35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—
See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular 50%
Band .....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag.....50%
One-Man Saw, 40%; Wood Saws, 40%; Hand, Compass, &c., 40%.
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth.50%
Band, 2 to 14 in. wide.....60%
Band, ¼ to 1¾.....60%
Crosscuts 45%
Narrow Crosscuts.....50%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....25%
Woodsaw Blades.....25%
Woodsaw Rods.....25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8.....25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination.....30%
Compass, Key Hole, &c.....25%
Butcher Saws and Blades.....30%
C. E. Jennings & Co.'s:
Back Saws.....25%
Butcher Saws.....30%
Compass and Key Hole Saws..35&5%
Framed Wood Saws.....30%
Hand Saws.....20&2½%
Wood Saw Blades.....35%
Millers Falls:
Butcher Saws.....15&10%
Star Saw Blades.....15&10%
Peace & Richardson's Hand Saws...30%
Simonds':
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws.50%
Band Saws.....50%
Back Saws.....25@25&7½%
Butcher Saws.....35@35&7½%
Hand Saws.....25@25&7½%
Hand Saws, Bay State Brand.....45%
Compass, Key Hole, &c..25@25&7½%
Wood Saws.....35@35&7½%
Springfield Mach. Screw Co.:
Diamond Kitchen Saws....40&10@50%
Butcher Saws Blades.....35@40%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws.....50%

Hack Saw Blades and Frames—
Atkins' Hack Saw Blades A A A A..25%
Disston's:
Concave Blades.....25%
Keystone Blades.....35%
Hack Saw Frames.....30%
Fitchburg File Works, The Best...35%
C. E. Jennings & Co.'s
Hack Saw Frames, Nos. 175, 180.....40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades.....40%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades.....35%
Diamond Hack Saw Frames.....50%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames...30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades.....25%
Victor Hack Saw Frames.....40%

Scroll—
Barnes, No. 7, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $15; with boring attachment, $25.....20%
Lester, complete, $10.00.....15&10%
Rogers, complete, $4.00.....15&10%

Scales—
Family, Turnbull's....50@50&10%
Counter:
Hatch, Platform, ½ oz. to 4 lbs. .....doz. $5.50
Two Platforms, ½ oz. to 8 lbs. .....doz. $16.00
Union Platform, Plain.$1.70@1.90
Union Platform, Stpd.$1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales.....30%
Chicago Scale Co.:
The "Little Detective"....25 to 30%
Union or Family No. 2.....60%
Portable Platform (reduced list)..50%
Wagon or Stock (reduced list)..25@35%
"The Standard" Portables.....50%
"The Standard" R. R. and Wagon.50%

Scrapers—
Box, 1 Handle.....doz. $2.00@2.25
Box, 2 Handle.....doz. $2.50@2.60
Ship....Light, $2.00; Heavy, $4.50
Adjustable Box Scraper (S. R. & L. Co.), $6.00.....45%
Chapin-Stephens Co., Box.....30@30&10&10%

Screens, Window and Frames—
Maine Screen Frames.....40&10&5%
See also *Doors.*

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@2.75; 1¼, $3.00@3.25; 1¼, $3.50@3.75
Bench Wood .....25@25&5%
Hand, Wood .....25@25&5%
R. Bliss Mfg. Co., Hand....30@30&10%
Chapin-Stephens Co., Hand.....25%

Coach, Lag and Hand Rail—
Lag, Cone Point, list Oct. 1, '99 .....75&15%
Coach, Gimlet Point, list Oct. 1, '99 .....75&10%
Hand Rail, list Jan. 1, '81.... 70&10@75%

Jack Screws—
Standard List .....75&10@80%
Millers Falls.....50&10&10%
Millers Falls, Roller.....50&10%
P., S. & W.....50%
Swett Iron Works.....75@80%

Machine—
List Jan. 1, '98:
Flat or Round Head, Iron.... 50@50&10%
Flat or Round Head, Brass.... 50@50&10%

Set and Cap—
Set (Iron).....80@80&5%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap.....75%
Hex. Hd. Cap.....75%
Rd. Hd. Cap.....60&10%
Fillister Hd. Cap.....60&10&10%

Wood—
List July 23, 1903.
Flat Head, Iron.....87½&10@..%
Round Head, Iron...85 &10@..%
Flat Head, Brass.....82½&10%
Round Head, Brass..80 &10@..%
Flat Head, Bronze...77½&10@..%
Round Head, Bronze.75 &10@..%
Drive Screws.....87½&10%

Scroll Saws—
See *Saws, Scroll.*

Scythes—
	Per doz.
Grass, No. 1, Plain....	*$6.25@6.75*
Clipper, Bronzed Webb.	*$6.50@7.00*
No. 3 Clipper, Pol'd Webb..	*$6.75@7.25*
No. 6 Clipper and Solid Steel,	*$7.00@7.50*
Bush, Weed and Bramble, No. 2	*$6.50@7.00*
Grain, No. 1.....	*$8.25@8.75*
Bronzed Webb, No. 1..	*$8.50@9.00*
Nos. 3 and 4 Clipper, Grain..	*$8.75@9.25*
Solid Steel, No. 6.....	*$9.25@9.75*

Seeders, Raisin—
Enterprise .....25@30%

Sets—Awl and Tool—
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18, 3, $12; 4, $9; 5, $7.....50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18....15&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel.....℔ doz sets $9.00

Sets, Nail—
Octagon .....gro. $3.50@3.75
Buck Bros.....27½%
Cannon's Diamond Point, ℔ gro.$12.40
Mayhew's .....℔ gro. $9.70
Snell's Cor'gated, Cup Pt...℔ gro. $7.20
Snell's Knurled, Cup Pt....℔ gro. $7.20
Springfield Mach. Screw Co.:
Diamond Knurled Cup Pt.℔ gro. $7.50

Rivet—
Regular list.....75@75&10%

Saw—
Atkin's:
Criterion 40%
Adjustable 40%
Bemis & Call Co.'s:
Cross Cut.....30%
Plate 20%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1, $15.00.....50%
Nos. 3 and 4, Cross Cut, $20.00...50%
No. 5, Mill, $30.00.....50%
Nos. 10, 11, 95, $15.60.....50%
No. 1 Old Style, $10.00.....50%
Special, $16.25.....50%
Giant Royal Cross Cut.....℔ doz. $8.00
Royal, Hand.....℔ doz. $4.50
Taintor Positive.....℔ doz. $4.75

Shaving—
Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00
Smith & Hemenway Co.'s.....60%

Sharpeners, Knife—
Chicago Wheel & Mfg. Co.....70%
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz.....$1.50
Mounted Kitchen Sand Stone, ℔ doz.....$1.50
Natural Grit Carving Knife Hones, ℔ doz.....$3.00
Quick Cut Emery Carving Knife Hones, ℔ doz.....$1.50
Quick Edge Pocket Knife Hones, ℔ doz.....$2.50
} 33⅓%

Skate—
Smith & Hemenway Co.....20%

Shaves, Spoke—
Iron .....doz.$1.10@1.25
Wood .....doz.$1.75@2.25
Bailey's (Stanley R. & L. Co.).....45%
Razor Edge (Stanley R. & L. Co.)..35%
Chapin-Stephens Co.....30@30&10&10%
Goodell's, ℔ doz. $9.00.....15&10%
Wood's F1 and F2.....50%

Shears—
	Cast Iron.. 7	8	9 in.
Best	*$16.00*	*18.00*	*$0.00 gro.*
Good ...	*$13.00*	*15.00*	*17.00 gro.*
Cheap .. $5.00		*6.00*	*7.00 gro.*

Straight Trimmers, &c.:
Best quality Jap....70@70&10%
Best quality, Nickel..60@60&10%
Fair quality, Jap....80@80&5%
Fair quality, Nickel..75@7'&10%
Tailors' Shears.....40@40&10%
Acme Cast Shears.....40@40&5%
Heinisch's Tailor's Shears.....10%
Wilkinson's Sheep, 1900 list, 30&10&5%; Grass, 50&10%; Horse or Mule, 50&10%

Tinners' Snips—
Steel Blades.....20&5@20&10%
Steel Laid Blades.....40&10@50%
Forged Handles, Steel Blades, Berlin, 50@50&5%
Heinisch's Snips.....40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in.....50%
Niagara Snips.....60%
P., S. & W. Forged Handles.....20%

Pruning Shears—
Cronk's Hand Shears.....33⅓%
Cronk's Wood Handle Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00.....25%
Disston's Pruning Hook only, ℔ doz.: $12.00 .....25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades....50&10%
P., S. & W. Co.....33⅓%
Wilkinson's Hedge, Wilcut Brand, 60&10%
Wilkinson's Lawn and Border, Wilcut Brand.....60&10%

Sheaves—Sliding Door—
Stowell's Anti-Friction.....50%
Reading 40%
R. & E. list.....33⅓%
Wrightsville Hatfield Pattern.....80%

Sliding Shutter—
Reading list.....40%
R. & E. list.....33⅓%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, Club, Rival, 10 and 12 gauge .....65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge 20%
Climax, Union, League, New Rival, 10 and 12 gauge.....25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge.....20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge.....33⅓
Robin Hood, Low Brass.....20&5%
Robin Hood, High Brass.....30&5%

Shells, Loaded—
Loaded with Black Powder..40%
Loaded with Smokeless Powder, medium grade.....40&5%
Loaded with Smokeless Powder, high grade.....40&10&10%
Robin Hood Smokeless Powder:
Robin Hood, Low Brass.....50%
Comets, High Brass.....50&10&5%

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron .....per keg $4.00
Steel .....per keg $3.75
Burden's, all sizes.....℔ keg $3.90

Shot—
Drop, up to B, 25-lb. bag....$1.85
Drop, B and larger ..... per 25-lb. bag, $2.10
Buck, 25-lb. bag.....$2.10
Chilled, 25-lb. bag.....$2.10
Dust, 25-lb. bag.....$2.30

Shovels and Spades—
Association List, Nov. 15, 1902..40%

Snow Shovels—
Long Handle.....$2.75@$3.00
Wood and Mall, D. Handle. $3.25@$3.50

Sieves and Sifters—
Hunter's Imitation..... gro.$9.50@10.00
Hunter's Genuine..... per gro. $12.00@12.50
Buffalo Metallic Blued, R. M. Co., ℔ gr.

14&16	16&18	18&20
$13.20	$13.50	$14.40

Sieves, Seamless Metallic
—Per dozen.—

	14	16	18	20
Mesh				
Iron Wire....	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire..	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested....doz. $0.90@0.95
Mesh 20, Nested....doz. $1.00@1.05
Mesh 24, Nested....doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 36 in....60&5%
20 x 40 to 24 x 50 in.....55%
24 x 60 to 24 x 120 in.....35%
Barnes' low list:
Up to and including 20 x 36 in....60%
20 x 40 to 24 x 50 in.....55%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron.....70@75&10%
Steel .....40@45%

Slates, School—
Factory Shipments.
"D" Slates.....50@50&10%
Eureka, Unexcelled Noiseless.. 60&5 tens
Victor A, Noiseless..60&4 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German .....40@40&10%
Covert Mfg. Co.:
Derby, 30&2%; Yankee, 30&2%; Yankee Roller, 30&2%.
High Grade, 45%; Trojan.....45%
Jockey 35%
Oneida Community:
Harness Snaps, 1 inch.....60&5%
Swivel Snaps.....60%
Swivels 50%

Snaths—
Scythe 50%

Snips, Tinners—See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality.....50&10@60&5%
Cheap .....60@60&10%
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton .....40&10%
Rogers & Bro., William Rogers' Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%

Miscellaneous—
German Silver.....60@60&5%
Cattaraugus Cutlery Co.:
Seneca Silver.....50%

Tinned Iron—
Teas .....per gro. 45@50¢
Tables.....per gro.$0.50@$1.00

Springs—Door—
Chicago (Coil).....40&10%
Gem (Coil).....20%
Pullman (Coil).....25%
Reliance (Coil).....40&10%
Star (Coil).....30%
Torrey's Rod, 30 in.....℔ doz. $1.10

Carriage, Wagon, &c.—
	1¼ in. and Wider:	*Per lb.*
Black		*4@4¼¢*
Half Bright		*4@4¼¢*
Bright		*4½@4¾¢*

Painted Seat Springs:
1½ x 2 x 26.....per pr. 42¢
1½ x 3 x 28.....per pr. 70¢

Sprinklers, Lawn—
Enterprise .....25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $24.....30%
Pleuger & Henger Mfg. Co.:
Cactus, 70%; Japanese, 75%; Nationals, 65%.

Squares—
Nickel plated.. } *List Jan. 5, 1900.*
Steel and Iron. } *75@80%*
Rosewood Hdl. Try Square and T-Bevels .....60&10&10@70%
Iron, Hdl. Try Squares and T-Bevels .....40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 67½%; Iron Stock and Bevel.....20%
Winterbottom's Try and Miter, No. 1, 40%; No. 2.....50%

Squeezers, Lemon
Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap .....doz. $1.00
Good Grade.....doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined...doz. $1.75

Staples—
Barbed Blind.....lb. 6@6½¢
Electricians', Association list.. 80&10&10&10%
Fence Staples, Plain, $2.25; Galvanized $2.55
Poultry Netting Staples..... per lb. 3¼@3½¢
Grand Crossing Tack Co.'s list..80&10%

Steels, Butchers'—
Dick's 30%
Foster Bros.....30%
C. & A. Hoffmann's.....40%

Steelyards—....30@30&10%

Stocks and Dies—
Blacksmiths'.....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates.....25%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25%

Stoners, Cherry—
Enterprise .....25@30%

Stones—Oil, &c.
Chicago Wheel & Mfg. Co., 1904 list:
Gem Corundum Oil, Double Grit.60%
Gem Corundum Axe, Single or Double Grit.....60%
Gem Corundum Slips.....60%
Gem Corundum Razor Hones....50%
Pike Mfg. Co., 1904 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in.$2.80
Arkansas St. No. 1, 5½ to 8 in.$3.50
Arkansas Slips No. 1.....$4.00
Lily White Washita, 4 to 8 in.60¢
Rosy Red Washita, 4 to 8 in...60¢
Washita St., Extra, 4 to 8 in.50¢
Washita St., No. 1, 4 to 8 in.40¢
Washita St., No. 2, 4 to 8 in.30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
Washita Slips, No. 2.....40¢
} 33⅓%
India Oil Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit.....33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit.....33⅓%
Quickcut Emery Rubbing Bricks.33⅓%

Hindostan No. 1, R'g'lar, ₱ lb 8¢
Hindostan No. 1, Small, ₱ lb 10¢
Axe Stones (all kinds)
Turkey Oil Stones, Extra, 5 to 8 in., ₱ lb 80¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips 40¢
Sand Stone 6¢
} 33⅓%

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $8.00 ₱ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots, ₱ gro. $9.00
One gross or more, ₱ gro. $7.20
Lots of 10 gross or more, ₱ gro. $6.00
Pike Mfg. Co., 1901 list:
Black Diamond S. S., ₱ gro. $12.00
Lamoille S. S., ₱ gro. $11.00
White Mountain S. S., ₱ gro. $9.00
Green Mountain S. S., ₱ gro. $6.00
Extra Indian Pond S.S., ₱ gro. $7.50
No. 1 Indian Pond S.S., ₱ gro. $7.00
No. 2 Indian Pond S.S., ₱ gro. $4.50
Leader Red End S. S., ₱ gro. $4.50
Quick Cut Emery, ₱ gro. $10.00
Pure Corundum, ₱ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%
} 25+2%

Stoppers, Bottle—

Victor Bottle Stoppers, ₱ gro. $9.00

Stops— Bench—

Millers Falls 15&10%
Morrill's, ₱ doz., No. 1, $10.00 50%
Morrill's, No. 2, $12.50 50%

Door—

Chapin-Stephens Co. 60@60&10%

Plane—

Chapin-Stephens Co. 20%

Straps— Box—

Cary's Universal, case lots 25&20%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket doz. $1.00
Bullard, ₱ doz. $4.00
Excelsior Stretcher and Tack Hammer Combined, ₱ doz. $6.00 20%

Strops, Razor—

Star Diagonal Strop 25%

Stuffers, Sausage—

Enterprise Mfg. Co. 25@25&7½%
National Specialty Co., list Jan. 1, 1902 30&5%

Sweepers, Carpet—

	₱ doz.
National Sweeper Co.:	
Louis XV, Roller Bearing, Gold Plated	$120.00
Hepplewhite, Roller Bearing, Silver Plated	$72.00
Sheraton, Roller Bearing, N'kel	$60.00
Ye Mission, Roller Bearing, Oxidized Copper	$36.00
Transparent, Roller Bearing, Plate Glass top, Nickeled	$36.00
National Queen, Roller Bearing, Fancy Veneers	$27.00
Loyal, Roller Bearing, Veneers, Nickeled	$25.00
Triple Medal, Roller Bearing, Nickeled	$24.00
Marion, Roller Bearing, N'kel	$24.00
Marion Queen, Roller Bearing, Nickeled	$21.00
Monarch, Roller Bearing, N'kel	$22.00
Monarch, Roller Bearing, Jap.	$20.00
Perpetual, Regular B'r'gs, N'kel	$20.00
Perpetual, Regular B'r'gs, Jap.	$18.00
Monarch Extra (17 in. case), Roller Bearing, Nickeled	$36.00
Monarch Extra (17 in. case), Roller Bearing, Japanned	$33.00
Auditorium (26 in. case), Roller Bearing, Nickeled	$54.00
Mammoth (30 in. case), Roller Bearing, Nickeled	$60.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.:	
Model E, Sanitaire	₱ doz $25.00
Model A, Sterling	₱ doz. $25.00
Model B, Sterling, Nickeled	₱ doz. $23.00
Model B, Sterling, Japanned	₱ doz. $21.00
Model C, Sterling	₱ doz. $21.50
Model D, Sterling	₱ doz. $19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.
American Carpet Tacks 90&40@—%
American Cut Tacks 90&40@—%
Swedes Cut Tacks 90&40@—%
Swedes Upholsterers' 90&50@—%
Gimp Tacks 90&50@—%
Lace Tacks 90&40@—%
Trimmers' Tacks 90&40@—%
Looking Glass Tacks 65@—%
Bill Posters' and Railroad Tacks, 90&50@—%
Hungarian Nails 85@—%
Finishing Nails 70&10@—%
Trunk and Clout Nails 80@—%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10&5% is given on light weights.

Miscellaneous—

Double Pointed Tacks 90&5 or 6 tens

See also Nails, Wire.

Tanks, Oil—

	Each.
Emerald, R. M. Co.	30-gal. $3.40
Emerald, R. M. Co.	60-gal. $4.25
Queen City, R. M. Co.	30-gal. $3.65
Queen City, R. M. Co.	60-gal. $4.50

Tapes, Measuring—

American Asses' Skin 50@—%
Patent Leather 25@30&5%
Steel $3 1-3&5%
Chesterman's 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin 40&10@50%
Favorite, Duck and Leather 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin 40&10@50%
Metallic 30@30&5%
Patent Bend, Leather 25&5@25&10%
Pocket 40@40&5%
Steel 33⅓@35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case 80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop 80&2½%
Monitor, Cross Head, &c. 70%

Brick Ties—

Niagara Brick Ties 25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White 20@20&5%

Hay—

Myers' Hay Tools 50%
Stowell's Hay Carriers, 50%; Hay Forks, 50%; Fork Pulleys, 50%.

Miniature—

Smith & Hemenway Co.'s 25%

Saw—

Atkins' Cross Cut Saw Tools 40%
Simonds' Improved 33⅓%
Simonds' Crescent 25%

Ship—

L. & I. J. White 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro. $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida 75@75&5%
Newhouse 40@45&5%
Hawley & Norton 65%
Victor 70&10%
Oneida Community Jump 50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢

Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, each $1.21; ₱ doz. $13.25
No. 3, Rat, ₱ doz. $6.50; case of 50 $5.75 doz.
No. 3½, Rat, ₱ doz. $5.25; case of 72 ₱ gro. $4.70 doz.
No. 4, Mouse, ₱ doz. $3.85; case of 150 $3.00 doz.
No. 5, Mouse, ₱ doz. $3.00; case of 150

Trimmers, Spoke—

$2.25 doz.

Wood's E I 50%

Trowels—

Disston Brick and Pointing 25%
Disston Plastering 20%
Disston "Standard Brand" and Garden Trowels 30%
Kohler's Steel Garden Trowels, ₱ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels, ₱ gro. $6.00
Rose Brick and Plastering 25&5%
Woodrough & McParlin, Plastering 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern 50&10%
Western Pattern 60&10%
Handy Trucks, ₱ doz. $16.00
Grocery, ₱ doz. $15.00
Daisy Stove Trucks, Improved Pattern, ₱ doz. $18.50
McKinney Truck, each $10.00
Model Stove Trucks, ₱ doz. $18.50

Tubs, Wash—

	No. 1	2	3
Galvanized, per doz.	*$4.25*	*4.75*	*5.25*
Galvanized Wash Tubs (R. M. Co.):			
No.	1	2	3 10 20 30
Per doz., net	$5.70	6.30	7.20 6.60 7.20 8.10

Twine, Miscellaneous—

Flax Twine:	*BC.*	*B.*
No. 9, ¼ and ½-lb. Balls	*.22@24¢*	
No. 12, ¼ and ½-lb. Balls	*.18@20¢*	
No. 18, ¼ and ½-lb. Balls	*.16@18¢*	
No. 24, ¼ and ½-lb. Balls	*.16@18¢*	
No. 36, ¼ and ½-lb. Balls	*.15@17¢*	
Chalk Line, Cotton ½-lb. Balls		*.25@30¢*
Cotton Mops, 6, 9, 12 and 15 lb. to doz		*.10@18¢*
Cotton Wrapping, 5 Balls to lb., acording to quality		*.14½@20¢*
American 2-Ply Hemp, ¼ and ½-lb. Balls		*.13@14¢*
American 3-Ply Hemp, 1-lb. Balls		*.13@14¢*
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine)		*.9¢*
India 3-Ply Hemp, 1-lb. Balls		*.9¢*
India 3-Ply Hemp, 1½-lb. Balls		*.7½@8½¢*
2, 3, 4 and 5-Ply Jute, ¼-lb. Balls		*.9½@10½¢*
Mason Line, Linen, ½-lb. Bls		*.16¢*
No. 26½ Mattress, ¼ and ½-lb. Balls		*.37¢*
Wool, 3 to 6 ply	*.B 7¢*	*A 7½¢*

Vises—

Solid Box 60%

Parallel—

Athol Machine Co.:
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co. 40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50.
Machinist and Tool Makers' No. 4A, $12.50; No. 5A, $7.00; No. 6A, $10.00; No. 10A, $22.50.
Presto Quick Acting 25@25&5%
Tiger Machinists' 40%
Fisher & Norris Double Screw 15&10%
Hollands':
Machinists' 40@40&5%
Keystone 65&5&70%
Lewis Tool Co.:
Adjustable Jaw 30%
Monarch, 50%; Solid Jaw 50%
Massey Vise Co.:
Clincher 40%
Perfect, 20%; Lightning Grip 20%
Merrill's 20%
Millers Falls 60&10%
Parker's:
Victor, 20@25%; Regulars 20@25%
Vulcan's 40@45%
Combination Pipe 55@60%
Prentiss 20@25%
Snediker's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ₱ doz., $24.00, 30%; Clamps 30%
Perfection Saw Clamps, ₱ doz. $4.50
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3 45&50%

Wood Workers—

Massey Vise Co.:
Lightning Grip, 15%; Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise 60&10%
Holland's Combination Pipe 60@60&5%
Massey's Quick Action Pipe 40%
Parker's Combination Pipe: 87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.

Wads—*Price per M.*

B. E., 11 up	*.60¢*
B. E., 9 and 10	*.70¢*
B. E., 8	*.80¢*
B. E., 7	*.80¢*
P. E., 11 up	*$1.00*
P. E., 9 and 10	*1.25*
P. E., 8	*1.50*
P. E., 7	*1.50*

Dis. 15%

Ely's B. E., 11 and larger $1.70@1.75
Ely's P. E., 12 to 20 $3.00@3.25

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled 55%
Ground 60%
Plain or Unground 65%
Country Hollow Ware, per 100 lbs. $2.75
White Enameled Ware:
Maslin Kettles 70%
Covered Wares
Tinned and Turned 40%
Enameled 50%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware 60%
Iron Clad Ware 70&10%
Lava, Enameled 40&10%
Never Break Enameled 50%

Tea Kettles—

Galvanized Tea Kettles:

Inch	*6*	*7*	*8*	*9*
Each	*.45¢*	*50¢*	*55¢*	*65¢*

Steel Hollow Ware—

Avery Spiders and Griddles 65@65&5%
Avery Kettles 60%
Porcelained 50&5@50&10%
Never Break Spiders and Griddles 65&5%
Never Break Kettles 60%
Solid Steel Spiders and Griddles 65&5%
Solid Steel Kettles 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone 40@40&10%

Washboards—

Solid Zinc: ₱ doz.
Crescent, family size, bent frame $3.25
Red Star, family size, stationary protector $3.25
Double Zinc Surface:
Saginaw Globe, family size, stationary protector $2.90
Cable Cross, family size, stationary protector $3.15
Single Zinc Surface:
Naiad, family size, open back, perforated $2.65
Saginaw Globe, protector, family size, ventilated back $2.50
Brass Surface:
Brass King, Single Surface, open back $3.25
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.25
Glass Surface:
Glass King, Single Surface, open back $3.25
Enamel Surface:
Enamel King, Single Surface, ventilated back $3.25

Washers—Leather, Axle—

Solid 80&10@80&10&10%
Patent 90@90&5%
Coil: ⅞ 1 1¼ 1½ Inch. 10¢ 11¢ 12¢ 13¢ per box

Iron or Steel—

Size bolt. 5-16 ⅜ ½ ⅝ ¾
Washers .$5.40 4.50 3.20 3.00 2.80
The above prices are based on $6.00 off list.

In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots... per lb. 1¾@2¢

Weather Strip—

Flexible Felt—

Lined, per 100 ft., $2; $3; $4 40&10%
Moore's Unlined, per 100 ft., $2; $3; $4 50&10%

Wedges—

Oil Finish lb. 2.70@2.80¢

Weights—Hitching—

Covert Mfg. Co. 40%

Sash—

Per ton, f.o.b. factory:
Eastern District $27.50@$28.00
Southern Territory $20.00@$23.00
Western and Central Districts $23.00@$25.00

Wheels, Well—

8-in., $1.55; 10-in., $2.00; 12-in., $2.50; 14-in., $4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9 80%
10 to 18 80&2½%
19 to 26 80&7½%
27 to 36 80&2½%
Galvanized:
6 to 9 75&5%
10 to 14 75&7½%
15 to 16 72½&10&2½%
19 to 26 75%
27 to 36 72½%
Coppered:
6 to 9 75&5%
10 to 14 75&7½%
15 to 18 72½&10&2½%
19 to 26 75&10&5%
27 to 36 75%
Tinned:
6 to 14 75&10&2½%
15 to 18 75&7½%
Annealed, Steel and Tinned, on Spools .70&10&10@70&10&10&10%
Brass and Copper on Spools... 60&5@60&10&5%
Brass, list Feb. 26, '96 15%
Copper, list Feb. 26, '96 25%
Cast Steel Wire 50%
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24 '03....90&20@90&25%
Brass Cup Hooks and Brass Screw Hooks 85@—%

Wire Cloth and Netting—

Galvanized Wire Netting 80&5@80&10%
Painted Screen Cloth, 100 ft., $1.00@1.10
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft. 3¢
Nos. 4 and 5 Mesh, sq. ft. 3½¢
No. 6 Mesh, sq. ft. 3½¢
No. 8 Mesh, sq. ft. 4¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural 75&10&5@80%
Alligator or Crocodile. 70&10@75%
Baxter Pattern S Wrenches... 70&5@70&10%
Drop Forged S 45@45&5%
Acme 60&10%
Alligator Pattern, 70%; Bull Dog 70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Bemis Pipe 60%
Combination Black 40&5%
Merrick Pattern 50
Boardman's 40%
Coes' Genuine Knife Hdl. 40&10&5&5%
Coes' Genuine Steel Hdl. 40&10&5&5%
Coes' Genuine Key Model 40&10&5&5%
Coes', Genuine Hammer Handle 40&10&5&5%
Coes' "Mechanics'" 40&10&10&5&5%
Donohue's Engineer 40&10%
Eagle 50&10%
Elgin Wrenches, ₱ doz. $6.25
Elgin Rethreading Attachment, one die, ₱ doz. $8.25
Elgin Extra Dies, ₱ doz. $3.00
Elgin Extra Jaws, ₱ doz. $1.75
Elgin Monkey Wrench Pipe Jaws, ₱ doz. $2.10
Gem Pocket 70%
Hercules 70%
W. & B. Machinist:
Case lots 50&5%
Less than case lots 50%
W. & B. Railroad Special:
Case lots 50%
Less than case lots 40&10&5%
Solid Handles, P., S. & W. 50&5%
Stillson 65%
Vulcan Chain 50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ₱ gross, $7.50; ₱ doz. $0.80

Wringers—

Tuttle Roller Press Mop Pail Wringer, each, $8.00; ₱ doz. $18.00

Wrought Goods—

Staples, Hooks, &c., list March 17, '92 90@90&10%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters' list net

Zinc—

Sheet per 100 lbs., $8.15@8.40